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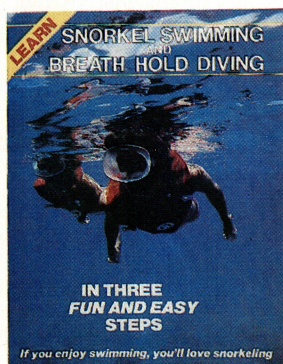
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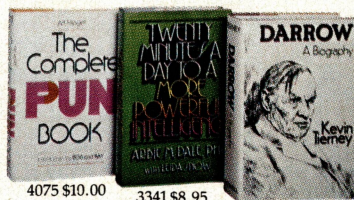
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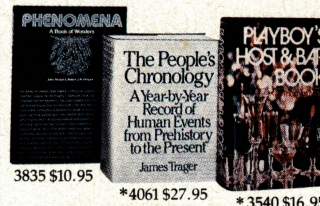
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skindiver

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COVER

Shari Kurgis makes a wall dive at fabulous Telephone Pole, a dive spot off San Salvador Island, Bahamas. She carries a Bauer movie camera to shoot black coral at 100 feet. Photo by Geri Murphy.

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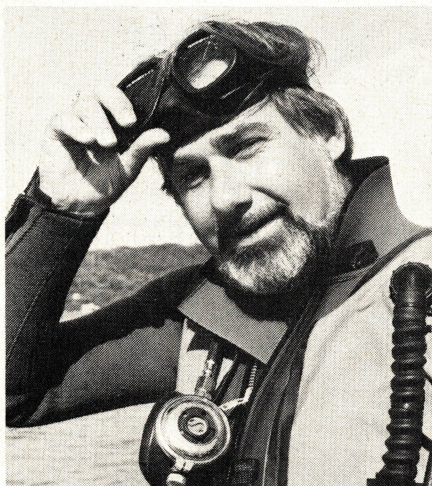
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SDM Editorial

BY THE PUBLISHER



COPING WITH THOSE WINTER SCUBA BLUES

Winter will arrive soon, bringing with it the traditional Christmas carols, office parties, and family gatherings. In some parts of the country, it also brings bone-chilling winds, and snow and ice on the local ponds.

For many divers, the beginning of winter means stowing away scuba gear until spring. Diving loses its appeal when the temperature drops and the wind blows fiercely. Unfortunately, the human body cannot be stored away as easily as a tank or regulator. Inactivity is the diver's worst enemy, as muscles and the circulatory system soon begin to deteriorate if not exercised.

Aside from outdoor sports, Americans are basically a sedentary society. We drive to the corner store instead of walking — we take the elevator in lieu of climbing the stairs — and we spend many hours in front of the television watching sport events instead of doing them ourselves. Meanwhile, our body functions dwindle to minimal activity status. Our lungs rarely expand to more than half their total capacity, and our hearts beat at slightly above idling speed. Muscles that were once firm and tough begin to turn to jelly. After one month of this kind of inactivity, most of the diver's physical fitness will have faded substantially. Two months away

from the water will turn even a super diver into a blob.

A program of regular exercise is essential to maintaining fitness for diving. There is a potential danger in losing diving fitness over the long winter months. The seasonal enthusiast faces a crucial period in the spring as he attempts to get back into diving. He no longer has the advantage of the preliminary training and conditioning which preceded his first open water check-out. Now he is trying to make a comeback with one quick step from the sofa to the open sea. Although the spirit may be willing, the body may not be.

Thinking about diving or talking about diving does not help to regain the stamina or scuba proficiency of last season. It is dangerous to attempt to rationalize the situation by thinking, "I won't get into a jam because I know my limitations." The out-of-shape diver has no idea of his limitations, since he has not been near the water for months. Physical fitness limitations can only be calculated by working in the water under actual diving stress conditions.

The best way to avoid the pain of reconditioning your body is by not permitting it to get out of shape in the first place. Maintaining a minimum degree of scuba fitness is a far easier alternative to beginning the long hard struggle back from months of inactivity. How can you stay fit for diving? The diver has three different options available to him depending on where he lives, how much time is available, and what contacts he has with other divers.

Perhaps the best way of remaining fit for diving is to continue diving throughout the winter. If you can make a couple of dive trips each month, you'll find it much easier going in the spring. Obviously, this is not possible in all parts of the country, but it is certainly an option available to those who live in California or Florida. You might consider taking a couple of short dive vacations or trips during the winter months, as this provides an excellent opportunity to exercise under more pleasurable environmental conditions. A trip to the tropics can result in six to ten dives in a surprisingly short period of time.

Those divers who live in northern parts of the U.S., where winter is more

severe, may not find it as easy to get out for an open water dive. Strong winds and frequent storms make it virtually impossible to plan weekend dive trips. However, a good alternative is to seek some form of activity at an indoor swimming pool. The most obvious is to swim laps at the local pool, making regular visits three times a week. For minimal scuba fitness maintenance, a quarter to half-mile swim is recommended. And to help things along, this swim should be done using fins, mask, and snorkel. Some divers even wear six pounds of lead weight.

Many YMCA's have for years conducted a fitness program called, "Swim for Life." Each swimmer keeps track of the distance he swims in his exercise session by marking it in on a large chart. The goal of this program is to swim 50 or 100 miles over a six-month period. The same rules could be utilized for a "Scuba for Life" program.

If you find that swimming laps is a bit too boring and you seek a more challenging program of exercise, you might want to contact a dive club or dive shop in your area to see if they are conducting any programs of regular pool competition. There is a new wave of enthusiasm which has recently begun to build for a variety of different pool games divers can play. In some parts of the country, a game called underwater rugby has gained considerable popularity and several dive shops in upstate New York are now formulating teams and regularly scheduled matches.

Underwater hockey has gained tremendous popularity in the Midwest and may some day become as great an activity here in the U.S. as it is in Europe. In many parts of the country, water polo has been a long-time favorite among dive clubs. Although this game is not played underwater, the strenuous exercise and competitive spirit involved certainly provide plenty of exercise.

Whatever activity you choose, it is important to stick with it throughout the winter and exercise regularly. Don't kid yourself by thinking that jogging, tennis, or snow skiing are adequate substitutes for diving. The only good exercise for swimming and diving is one which is actually done in the water—and the best way to stay fit for diving is to dive. ▶

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Underwater Forum

The Notorious U-352

I have with tongue in cheek been listening to and reading articles about the now notorious German submarine, the U-352, resting at 100 feet some 35 miles off the coast of North Carolina. Always mentioned is the alleged desecration of the ship — where divers entered the sub and removed the human bones of those who perished when the ship was scuttled, and that these bones went on display in a dive shop in Jacksonville, etc., etc.

When a diving party of five arrived in my shop the other day and asked where the bones were that we had for sale, I felt it was time to set things straight. They had travelled all the way from southern Georgia after listening to some local TV program where a sensationalistic reporter of some sort claimed that a dive shop in Jacksonville was selling finger bones and that the going price was 25 bucks. As my shop is the only one in Jacksonville I am a little confounded by it all and feel that the adverse publicity is hurting both my reputation and my business.

At the time of the scuttling of the U-352, the exact position of the sinking was known but, because all scuttling charges were not set off, some compartments, including the Captain's cabin, were still sealed off and contained air. The sub was thus quite buoyant and she was carried by strong ocean currents a considerable distance from where she sank.

Not until 1974 was she found again. At that time five divers from Wilmington, including a diver from Kingston, NC and the owner of a dive shop now out of business, dived the U-352 extensively and everything that could be removed, inside and out, was removed. All human remains including the identification bracelets were taken.

As I have been in this area only 2½ years and opened my shop about 2 years ago, I can only state from hearsay that some of these human bones may have been displayed. But I also know that the dive shop owner contacted the German authorities and that the remains were finally shipped back to Germany.

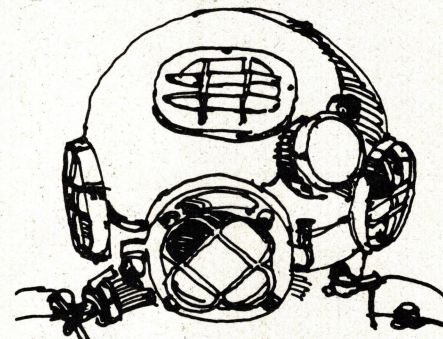
The point is, our shop, the only one now in Jacksonville, was not involved.

SWEDE AHLMARK
The Scuba Center, Inc.
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Jewish Country

We thoroughly enjoyed the article on Jewish Country in the September issue. It aptly demonstrates that there are indeed things to see while diving in the

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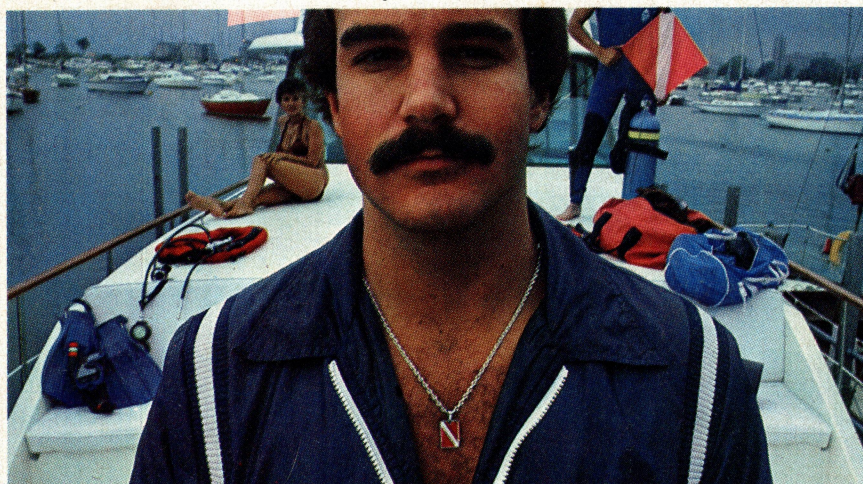
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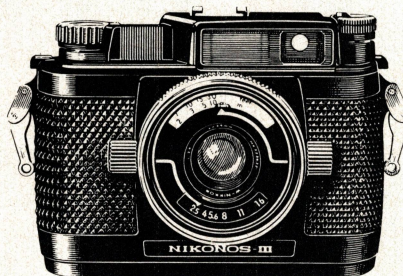
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Monterey Memories

Last October my wife and I made a 25th anniversary trip to California. New England Divers in San Francisco suggested we dive in the Monterey area and that we contact the Monterey Dive Center.

I took the advice and had one of the most fascinating dives of my life. Seals joined me in play and I could actually touch them. Equally impressive were the friendliness and helpfulness of the people at the Monterey Dive Center. The shop is a family affair and the "Lady of the House" was as thrilled about my experience as I was at having it.

Jersey Coast wreck diving is exciting, but my California experience will be one that I will always treasure.

ALFRED P. WEISS
BOONTON, NJ

Willful Waste

For a month I have been an American guest on Little Cayman, the unspoiled, "forgotten" island of the three Caymans. For a number of reasons, this Caribbean gem does not receive the influx of tourists the other islands receive; most foreigners coming here are families who own small summer homes or who have vacationed here regularly for a number of years.

One such family from St. Petersburg, Florida recently stayed for two weeks, and during their visit, the two young men in their party, both in their late teens, took full advantage of the plentiful yet diminishing natural resources of the surrounding waters. Unfortunately, they did so in a most unconscientious and aggressive way.

In violation of the Marine Conservation Law of the Cayman Islands, they 1) used scuba to spear fish; 2) took spiny lobsters out-of-season; 3) took undersized lobsters; and 4) took shovelnose lobsters, which may not be taken at any time.

Although not in violation of any written law, but certainly not consistent with a sensitive or perceptive concern for the environment, they also 5) took female lobsters with eggs; 6) used a powerhead speargun to kill octopus, shark and other

DIVE IN COLOR

Facts are facts and color is a fact of life. Basic black has been a fact of life for too long. There are good reasons for color in dive suits. Identification, visibility, safety, not to mention style. Sea Suits believes in color, so in addition to our standard colors we are introducing some new color combinations. Brown, green and navy blue. When added to our standard colors they make an array of color combinations and options that is quite impressive.

We make the strongest, best fitting, best looking dive suit on the market. We see nothing wrong with making it better. In custom you can now mix and match to your heart's content. In our standard off the shelf suits there will be an even larger selection of color options.

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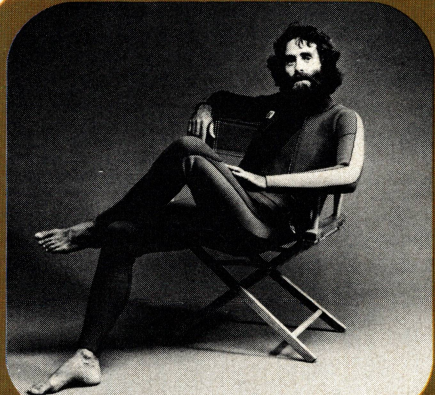
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UNDERWATER FORUM

animals for sport (not defense); and 7) caught shark and barracuda exclusively to remove the jawbones to sell and give away, with no attempt to use the meat (barracuda commonly is eaten by local residents).

To me, it was a disturbing and infuriating display of the visitor who abuses the hospitality and resources of the place he visits. It made me wonder whether we ever will learn to go to a place and enjoy it without feeling we must bring some aspect of the environment to its knees with our human strength, tools and excessive habits. It also led me to recall the adage, "Willful waste leads to woeful want."

K. C. SMITH

LITTLE CAYMAN, BWI

Ginnie Springs

When we received our June, 1979 issue of SKIN DIVER, my son, an avid diver, called my attention to the excellent article, on page 64, about Ginnie Springs near Gainesville, Florida.

The article, by Bill Barada, convinced me we should stop at Ginnie on our next trip to Clearwater. We spent two exciting, delightful days at the Ginnie Springs campground, the first week of July. We discovered that everything Bill said in his article was true. The diving is exciting, but safe, and the staff including Bob Wray was really interested in doing everything they could to make our stay enjoyable.

DAVID C. BOKER

RESTON, VA

Marine Mammals

We have been following the articles pertaining to diving with dolphins and other marine mammals which have been published in your magazine over the past two years. In no article was mention made of the U.S. Federal Law protecting marine mammals against harassment.

This law comes in the form of the Marine Mammal Protection Act of 1972. Harassment by this law is defined as "... the restraint or detention of a marine mammal, no matter how temporary; ... or the negligent or intentional operation of an aircraft or vessel, or the doing of any negligent or intentional acts which result in the disturbing or molesting of a marine mammal." This pertains to all U.S. Citizens in or outside the continental U.S.

A simple explanation about federal laws and regulations makes a great deal of difference between cooperation by the general public and having to invoke a fine that can be as high as \$20,000, one year imprisonment, or both for each count.

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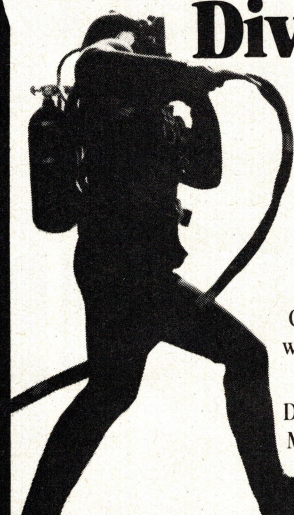
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UNDERWATER FORUM

Price Correction

The June SDM Summer Shopper's Guide incorrectly lists Fuji Photo's Fujica Marine-8 AX 100 at \$89.95. The complete unit is currently selling for \$244.95, a difference of \$155. We regret the inconvenience this error may have caused to retailers or their customers.

The Church Method

My wife and I recently returned from the most fulfilling and exciting vacation we have ever experienced — Cathy and Jim Church's Underwater Photography course — offered at Spanish Bay Reef, Grand Cayman in the British West Indies.

The course offers superior, unhassled diving, excellent accommodations, mouthwatering cuisine and expert teaching geared to please the novice as well as the experienced photographer. Every aspect of underwater photography is covered in detail with a unique flare which seems to make even the most complex techniques simple. Our group of students designated that special flare "The Church Method."

But why the most exciting vacation of our lives? We have dived all over the world and have had the privilege of many super vacations. The answer is simple — Cathy and Jim Church. Each student receives their complete attention every moment of the course. Cathy Church bubbles with enthusiasm and has such a delightful personality that one cannot possibly be bored while in her presence. One moment she is serious while stressing some essential point, the next she is gently teasing some student and her eyes sparkle with laughter.

Jim is her equal and has a subtle humor which keeps all the teaching sessions light and fun. Yet, he is also a superior technician who has mastered the technique of exploring his art in a simple and interesting way.

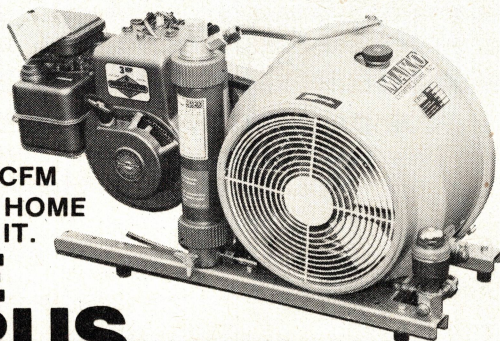
Equally important is the way they blend together as if they were a harmonious song. They enjoy each other and what they are doing. There is an absolute absence of underlying tension. They fill the evenings with their many exciting experiences and the many fantastic slide shows they have put together.

It is the greatest vacation bargain we've ever received.

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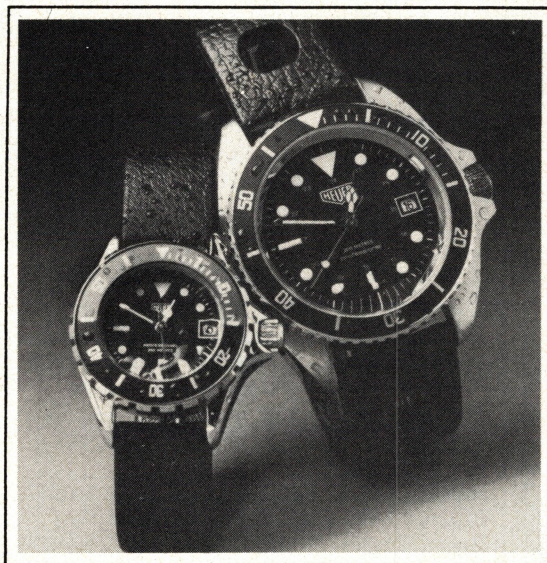
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Princeton Tectonics Proudly Announces the Heuer Dive Watches



PRINCETON TECTONICS, manufacturer of the Bottom Timer, has been chosen by HEUER of Switzerland as their U.S. distributor to the diving industry. Heuer is already well known as a standard of excellence by the followers of Grand Prix Formula I racing and as timekeeper at the Olympic games.

Princeton Tectonics would not undertake to represent any timepiece other than its own unless they were firmly convinced of its quality and reputation. Heuer, in their opinion, more than amply fits this criteria.

Heuer dive watches include the MEN'S 844 AUTOMATIC with date display, stainless steel case, screw-on crown, exterior turning bezel with click stop, mineral glass and is water resistant to a depth of 660 feet. The 844 Automatic has a suggested retail price of \$155. A MEN'S 8440 QUARTZ model includes all the features of the Automatic and is priced at \$205. There is also the LADIES' 756 AUTOMATIC which retains all the features of the Men's Automatic in a trimmer design and retails for a suggested price of \$165.

The New BT-400 Bottom Timer™

Designed for the serious diver who demands more from his gear, the BT-400 has all the attributes of the original Bottom Timer™, but, with important additional features:

- High visibility *all luminous* dial with contrasting black numbers.
- A red *full sweep* second hand.
- An *altitude adjustment* screw to allow setting of the BT-400 for any diving locale.

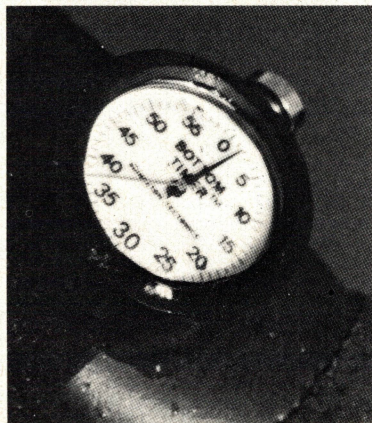
Please write or call for complete information on the new BT-400 Bottom Timer and the HEUER Dive watches.

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PRINCETON TECTONICS

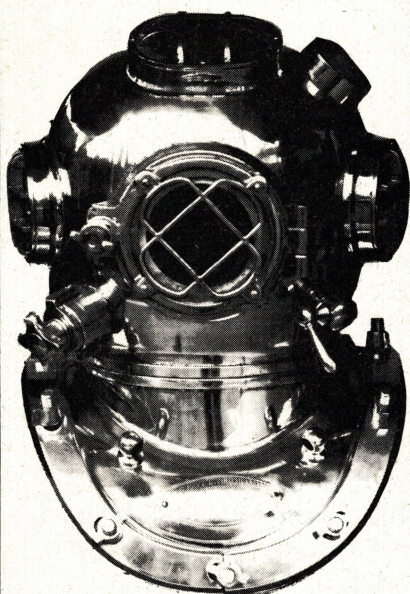


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Shows'n Events

November 2-4 Ontario Underwater Council Fall Convention, Holiday Inn, Burlington, Ont. (Contact: Kim Barton, 80 St. Andrews Dr., Hamilton, Ont., Canada)

November 2-3 Innerspace Pacifica '79, Hawaii Council of Diving Clubs, Kaimuki High School Auditorium, Honolulu, 7:30 p.m. (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

November 3 8th Annual Inward to the Sea Film Festival, George Washington University, Washington, DC (Contact: Inward to the Sea, PO Box 41010, Washington, DC 20014 [202] 347-0206)

November 3-4 Paleontology festival, Gainesville (Contact: Blue Holes, G. E. Ryschkewitsch, 10 SW 41st St., Gainesville, FL 32607)

November 3 Michigan Skin Diving Council Film Festival, Pick Motor Inn, Grand Rapids, 7 p.m. (Contact: John Swierczewski, Scuba Limited Ent., 2885 Seabolt Ave., Muskegon, MI 49445)

November 9 Innerspace Pacifica '79, Wailuku, Maui (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

November 9-10 3rd Annual Rockford Divers Film Symposium featuring Rick Frehsee, Holiday Inn, South Beloit 8 p.m. (Contact: Bill Steinborn, 1385 Randall Dr., Rockford, IL 61108)

November 10 Innerspace Pacifica '79, Hilo, Hawaii (Contact: Innerspace Pacifica '79, PO Box 3061, Honolulu, HI 96802)

November 17-18 Aquaspace '79 3rd annual symposium and film festival of the Aquatic Exploration and Research Associates, Univ. of Windsor, Windsor, Ont., Canada (Contact: Glen Adams, 10275 Shenandoah Cr., Windsor, Ont., Canada [519] 735-8688)

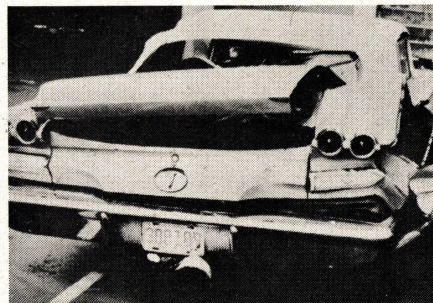
November 17-18 Info '79 YMCA Reef Ecology program, Holiday Inn, Kennedy-O'Hare, Chicago (Contact: Lou Nesslar, 390 Brandon, Glen Ellyn, IL 60137)

November 17 An Evening with Stan Waterman, New Jersey Council of Diving Clubs and Princeton YMCA Scuba Club, McCosh 50, Princeton University (Contact: Princeton Aqua Sports, 306 Alexander Rd., Princeton, NJ 08540 [609] 924-4240)

November 18 Baltimore's 2nd Annual U/W Film Festival featuring Stan Waterman, Humanities Theatre, Catonsville Community College, Catonsville, MD, 7 p.m. (Contact: Nick Caloyianis, 442 Chal-fonte Dr., Baltimore, MD 21228)

TIPS

To Insure Perfect Scuba

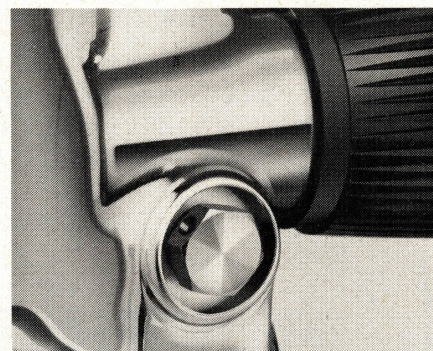


TANKS— HANDLE WITH CARE

Because the potential energy in a fully charged compressed air cylinder is very high, storage and handling of tanks require special precautions.

Whenever you transport a tank, whether by car, boat or other means, be sure it is securely tied, blocked or held in place to prevent damage to both the tank and the vehicle. Be particularly careful not to store tanks where heat may build up. Heat will cause air in the cylinder to expand. If the air pressure becomes greater than the maximum rating of the safety disc an extremely hazardous jetting effect may occur. The tank will become a lethal projectile and can cause considerable damage and injury. A tank improperly stored in a car trunk on a hot day, for example, can easily blow through the side of the car and become a danger to anyone or to anything in the immediate area.

One important safety precaution available on some tank valves is an anti-jetting relief port, or burst plug. Its purpose is to keep the cylinder from torpedoing should the valve's safety disc rupture.



All Sherwood valves have anti-jetting relief ports with cross-ported escape outlets to disperse air in three directions at once, and effectively prevent jetting. Sherwood valves also carry highly visible, pressure rating labels to make it easy to match valves and cylinders.

If you're not sure of your valve-cylinder pressure compatibility, have it checked by your dive shop before your next fill. And, get all the facts on the full line of dependable Sherwood gear.



SHERWOOD

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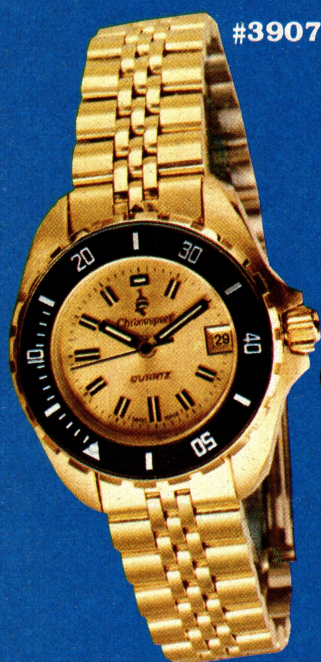
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SS-205

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2. SECOND TIME ZONE
3. SECONDS AND DATE

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The most popular Chronosport watches for women and men, available in solid stainless steel and 20 micron goldplated Champagne editions. Mineral crystals, one way ratcheted bezels, screw down crowns and quartz movements guaranteed accurate to within one minute a year are all standard as well as pressure tested cases to 990 ft.

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MINI QUARTZ 30 FOR WOMEN

#3806 Steel on strap	\$195.00
#3807 Steel on steel bracelet	\$220.00
#3906 Champagne on strap	\$245.00
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SDM'S BUYER'S GUIDE TO DIVE WATCHES

BY ELLSWORTH BOYD

Time — it never rests, but rushes on, swift and silent, like an all-embracing tide, sweeping us along like tiny pebbles in the sand. Surely not one of us, even the least imaginative, can consider time, without *some* feeling of awe. We revere it, respect it, and sometimes neglect it, but nonetheless it governs our lives and dictates our future.

Just as time is respected, so is the diver's watch, one of the most important instruments in professional and sport diving. And like a lot of other dive equipment, watches are making astronomical advances in the tail end of our 20th century. Terms like "Modern Renaissance," "space-age spin-off," and "scientific impact," are being applied to the latest products, research and development in dive watches.

A dive watch used to be simply a mechanism actuated by springs, wheels and weights to move a pointer on a dial. But like Buck Rogers, the space-age spin-off brought us such things as: high frequency oscillation, analog quartz, liquid crystal digital display, and integrated electronic circuits.

The quartz movement is not new to the watch industry, but it is a current trend in the dive watch business. It is now more perfected, reliable and practical, with two major advantages — precision accuracy and fewer working parts.

The principle used in the quartz watch is not too difficult to understand. Perhaps the best way to explain it is to compare the structure of the quartz watch with a mechanical watch. The basic difference between the two is that the mechanical

watch uses a balance wheel for a time base and a mainspring for power, while the quartz watch uses a quartz crystal and a battery instead.

The standard quartz crystal vibrates at the incredible rate of 32,768 times per second. There's a little integrated circuit, one-eighth of a square inch, which divides the frequency of the quartz crystal from 32,768 times per second, down to one per second. A micro current passes the one impulse per second on to a little electro-motor called a "step motor." (It turns a step from each impulse received by the integrated circuit.)

That motor drives a few wheels, the hands on the dial, and the calendar, with continuous split-second accuracy. Since there are fewer moving parts in the quartz watch, there is less chance for failure.

One-way ratcheted bezels are another trend in underwater watches today. The bezel, an elapsed time indicator and protective metal ring surrounding the crystal, works on two small steel springs. One spring holds it to the case and the other regulates the one-way ratchet as it turns in a counter-clockwise direction. The concept behind this design is simple: If the diver accidentally turned the bezel on a decompression dive, the elapsed time could only increase. (If it decreased, a diver would be in danger of over-extending the dive.)

CHRONOSPORT

How do you choose from the vast array of men's and women's dive watches offered on the market today? Johann M.

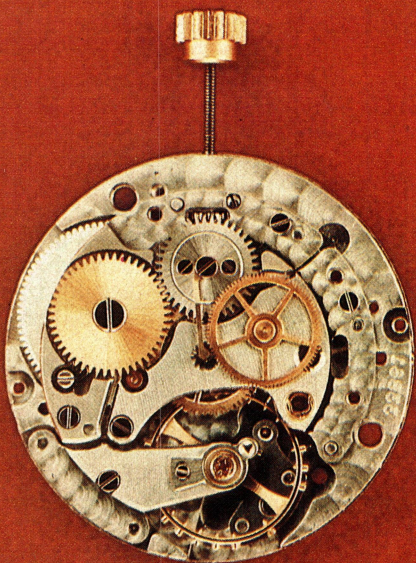
Jorgo, Vice-President and Service Manager of Chronosport, Inc., Rowayton, Connecticut, offered some sound advice: "You don't want to get too technical in describing the variety of watches on the market today. . . . Give the pros and cons. Then, let the divers make their choices." When I asked him to name the single most important feature in a dive watch, Jorgo said, "Water resistance, closely followed by service."

Service is Chronosport's forte. They offer a 48 hour turn-around as part of a yearly service package. This means the watch will be serviced and placed in the return mail 48 hours after Chronosport receives it. The standard service charge for the Sea Quartz series is \$15. This includes a new battery, a check on the accuracy of the movement (the working parts or guts of the watch), and if necessary, adjustment to specifications, and pressure-testing of the case.

O-rings can wear out in everyday use, but preventive maintenance will detect this and other faults.

When the O-rings are fitted at the factory, a little silicone is put on them, especially on the back where the largest O-ring seals in the movement. These might get brittle, but it would be after many years of use. The most serious gasket is in the crown, a more likely spot for leakage. The crown, normally a winding and setting knob, renders the case water-resistant through its O-ring gasket. Daily winding will wear the O-ring out. It can be a critical spot in all underwater watches, but not as critical in quartz watches as it is in mechanical ones because a quartz

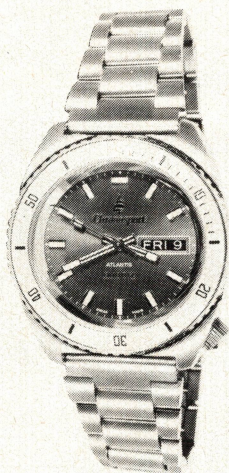
photograph by Geri Murphy



One of the most important instruments in professional and sport diving, the diver's watch is a highly complex piece of machinery. Divemaster Tom Stansell (right) carefully sets his bezel at the start of his drop-off dive.



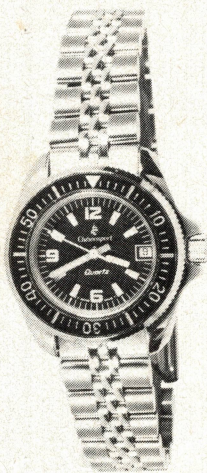
CHRONOSPORT



3203
Atlantis



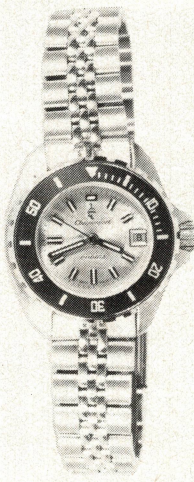
3207
Sea Quartz 30



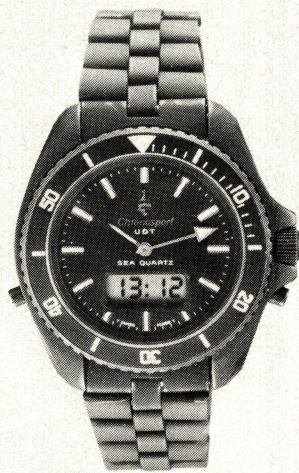
3807
Mini-Quartz 30



3407
Champagne Sea Quartz 30

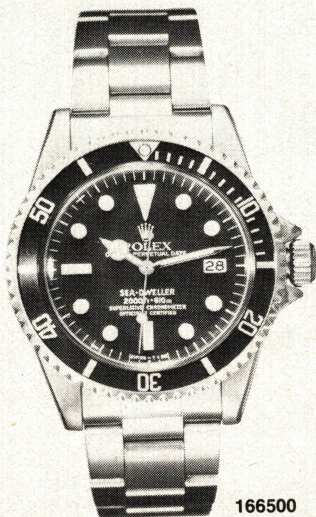


3907
Champagne Mini-Quartz

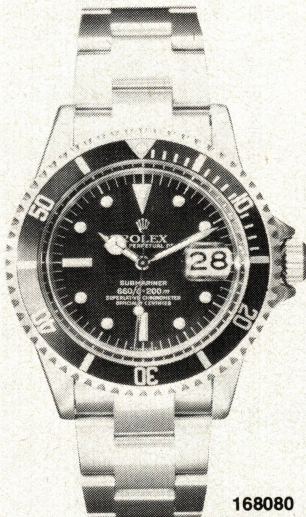


3307
Sea Quartz

ROLEX



166500
Sea-Dweller



168080
Submariner

watch does not require winding (it runs on a battery instead of a main spring).

All Chronosport Swiss-made dive watches feature screwdown crowns that lock into place like the hatch on a submarine. This renders the movement impervious to outside elements such as water, sand or dust. The crown is recessed into the metal case, protected by two little horns or shoulders on either side of it.

All but two of Chronosport's dive watches feature a mineral glass crystal. A tempered glass, it is being utilized now by many dive watch manufacturers because it lasts longer than a plastic lens. It is less affected by temperature changes, too (extreme heat or cold) and is more scratch resistant. Divers should send their watch in immediately for repairs if moisture appears beneath the crystal.

Jorgo also warned that a watch shouldn't be opened under any circumstances, not even to change a battery. He has received many watches from do-it-yourselfers who failed at watch repair. He recommends a thorough freshwater rinse of watch and band after diving in salt water. It's easy for salt and dust to accumulate beneath the bezel, making it hard to turn and possibly causing skin irritation from the band.

There's an exceptionally good guarantee with Chronosport watches — five years, (usually the guarantee is just one year) but you must return the watch yearly and pay a service charge of \$15. All guarantees are "limited." This simply means that the manufacturer will stand by the watch as long as there hasn't been any extraordinary abuse to it.

Although relatively new to the dive watch line, Chronosport has pioneered both men's and women's quartz dive watches in the American market.

ROLEX

T. Walker Lloyd, Oceanographic Consultant and Director of Special Events, greeted me at the Rolex Watch Corporation in the heart of Manhattan and told me about Rolex's illustrious background. In 1926, after years of tests and research, Rolex introduced a case called the Oyster, developed to ensure a dust, dirt, humidity and water protected movement. In an astounding test that took place in 1960, a Rolex watch was attached to the outside of the Piccard submersible, *Trieste*. The Oyster case successfully survived a depth of 35,798 feet, withstanding a pressure of 15,951 psi!

There is no O-ring seal between the plastic glass crystal and the watch. The plastic glass is flexible, snaps over the watch, and is individually sealed. As pressure increases the seal becomes more secure.

The watches Rolex designs for divers are known as Submariners, guaranteed

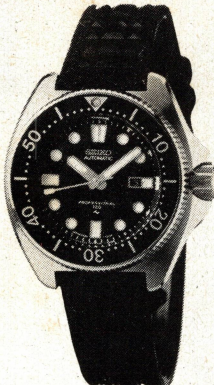
SEIKO



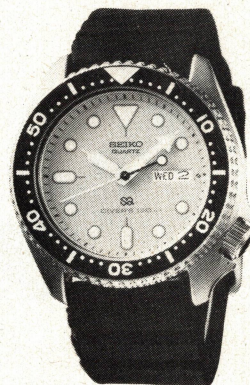
60583
Professional Diver's 600



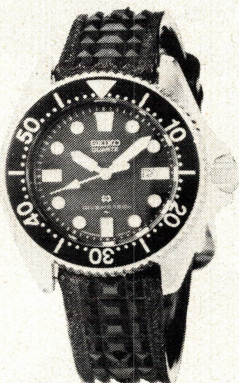
60585
Diver's 300



ZP249
Professional 150



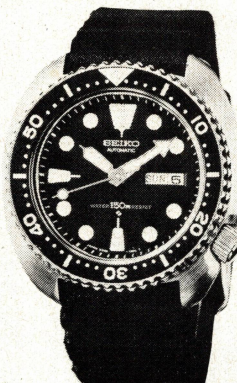
60595
Diver's 150



XP007
Diver's 150



ZP251
Professional 150



DE095
150



60597
Diver's 150

from 660 to 4000 feet, depending on the model. Submariner #5512 is a 26 jewel, self-winding watch officially certified as a chronometer. To merit the coveted title of chronometer, each watch must be individually tested for 15 days and nights by a Swiss Institute for Chronometer Tests. After passing these rigorous tests the watch is awarded official chronometer certification.

The number of jewels depends on the design of the movement. Jewels are to a watch what roller bearings are to an engine. They reduce friction and make it last longer. They are important for accuracy, but primarily aid the mechanical movements. The more jewels, the more mechanically sound the watch will be. An interesting note about jewels is that you'll find fewer in quartz watches than in mechanical watches. That's because quartz watches have fewer moving parts and do not need as many jewels.

When I asked Lloyd to compare the self-winding mechanical watch to the battery-driven quartz watch, he agreed that the quartz watch is more accurate and uses fewer parts. But he emphasized that both the quartz crystal and the battery efficiencies can be greatly affected by extremes in temperatures, such as low temperatures in the Arctic

and high ones in the Caribbean and other hot areas throughout the world.

SEIKO

"The difference in quartz technology over mechanical processes is like wine and water," says Milt Putterman, Corporate Vice-President for Technical Affairs of Seiko Corporation of America. "Quartz watches stand on their own merits as far as accuracy and reliability are concerned. A variation of ten seconds a day is the standard for a mechanical chronometer, but in a quartz watch the variation is usually less than one minute a year. What's more, they don't have as many friction points, and lubrication isn't as critical because there are less mechanical parts in a quartz watch. It's easier to repair too because there are no hairsprings, balance wheels or escapements."

Seiko has three factories in Japan: One specializes in clocks, while the other two provide capabilities for a variety of watches, including diving time-pieces. High atop the New York offices, I spoke with Scott Chou, Assistant Manager of Technical Training. "Service is a vital concern at Seiko," said Chou, "how quickly we return the watch depends on what's wrong with it. If it's simple we'll re-

pair it within one week. If it's more complicated and we have to retest it, then it may be three weeks. Seiko offers a limited one year warranty on all dive watches." An overhaul or basic maintenance at the Seiko service center costs about \$29.

AQUADIVE

Maria Van Drimmelen, Executive Vice-President at Aquadive, in Los Angeles, has been managing her father's company for over seven years. Aquadive has manufactured 53 different dive watches since 1972 and, like other companies, they've joined the "quartz generation."

"The quartz accuracy can't be beat," Ms. Van Drimmelen told me. "The plus or minus accuracy of a quartz product is two minutes per year, which translates to ten seconds per month. And with batteries constantly improving, we should get 15 to 18 months on one now and maybe more in the future."

Aquadive's quartz watches carry a five year limited guarantee while the guarantee for the mechanical ones is one year.

The Swiss Watch Technical Center, a non-profit organization established by Swiss factories to service Swiss watches in the U.S., handles Aquadive products at two service centers: one in Long Beach, California, and the other in Lititz,



BULOVA



Pennsylvania. There's no charge for one year "in warranty" service; out of warranty repairs costs \$25 for all models. Aquadive recommends a two-year check-up, which includes a battery and O-ring replacement, all for \$15. Quartz watch warranties are good for five years if returned every 10 to 15 months; the service charge is \$15. Most watches will be returned within 12 days.

Aquadive is the only dive watch manufacturer that markets a combination depth gauge and timepiece. The Time/Depth Model is an electronic precision instrument featuring a 13 jewel Dynatron (half electronic circuitry and half mechanical) movement. The movement is powered by a Union Carbide 1.35 V mercury battery, good for 10,000 hours, which should be replaced once a year. Because it's half mechanical, the Dynatron movement drains the battery a little faster than the quartz movement.

BULOVA

H. C. "Hank" Titchell, Vice-President of

Corporate Relations of the Bulova Watch Company, Inc., in Jackson Heights, N.Y., believes that quality is the most important aspect of any underwater watch. "Style and appearance are not as important," says Titchell, "since a dive watch is subjected to many bumps and pressure and temperature changes."

"No matter how you look at it," Titchell added, "watches designed for underwater use are timing instruments, and their reliability is often vital to the safety and well-being of the diver." Titchell does not recommend regular check-ups for a diving watch. "In many instances," he says, "a good seal is disturbed in the process of opening the watch case."

For visibility and clarity Bulova uses bright colors on the dial and hands. Fluorescent hands appear on most models, emitting a glow when subjected to minimal light sources. The company produces over 20 watches with either mechanical or electronic quartz mechanisms. Some are pressure tested to 333 feet and some to 666 feet. Each watch is tested several times.

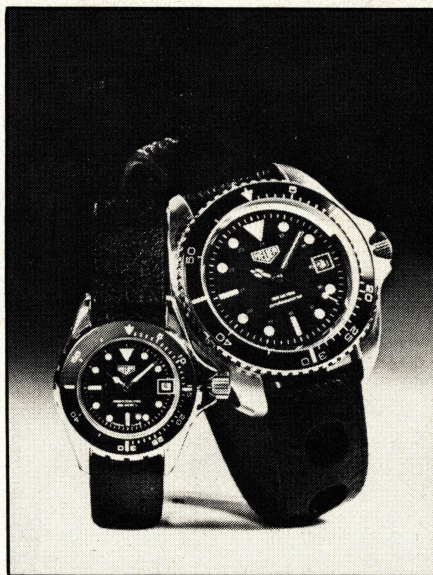
Bulova products are sold exclusively through jewelers and department stores, with full service centers in N.Y., Georgia, Texas, California, Illinois and Canada. A damaged watch will be repaired and returned within 13 working days.

HEUER

John Hubacher, Executive Vice President of Heuer (pronounced Hoyer) Time and Electronics, announced that Princeton Tectonics of Hightstown, New Jersey, distributes Heuer watches to the dive industry. Heuer, called Leonidis in Switzerland, is 110 years old and the largest manufacturer of stopwatches in the world. Official timekeepers for the Olympic games in Lake Placid, Heuer will command the same countenance in Moscow, 1980. Dealing through three subsidiaries — in the U.S., Germany and England — the company markets its products in 100 countries.

It wasn't until the last two years that Heuer, in keeping with its sports image, added dive watches to its line. When I talked with Hubacher, his company had three underwater timepieces, but new models in men's and women's quartz, and models in mechanical movements were due on the market in the near future.

Heuer's standard features include a stainless steel case, rotating one-way ratcheted bezel, screwdown crown, mineral glass crystal, and Swiss movement, water tested to 660 feet. All watches carry a limited one year guarantee. The quartz guarantee is renewable if sent in yearly at a charge of \$15. The main service center is in New Jersey, but there are also two branches in New York, specializing in service for Heuer products. The average turn-around time is two weeks.



HEUER
756 844

Hubacher says that yearly inspections of dive watches are a good idea, but not absolutely necessary, unless you want to retain your guarantee on a quartz.

CRESSI-SUB

Manufactured in Switzerland especially for Cressi-Sub, the Cressi men's and Cressi women's dive watches both carry lifetime guarantees. Ron Leonard, Marketing Manager at Cressi-Sub's Miami office, says, "Of course if someone abuses a watch unnecessarily — such as pounding it with a hammer or running it over with a car — we'll take exception to that. But, with normal care and maintenance, our watches should last a lifetime."



CRESSI-SUB
728 UDT Model 729 Ladies' Watch

Leonard advises a thorough freshwater rinse after every dive. "Turn the bezel while you're rinsing it to remove any trapped salt particles and to prevent a build-up of salt in the ratchet mechanism." Ordinarily, no other maintenance is necessary, according to Leonard. But, should minor repairs be called for, Cressi will generally either make them and return the watch within a week or 10 days, or send the owner a new watch.

Both Cressi watches have a self-winding mechanical movement, a one-way ratcheted bezel and screwdown crown. A unique feature of the men's watch is the military, 24 hour time scale which is included in red numerals.

DACOR UWM 1



DIVETIME INDUSTRIES DIVEMASTER



DACOR

All three Dacor dive watches are Swiss-made especially for the Chicago-based dive equipment company. They are precision built watches which incorporate stainless steel cases and screwdown, O-ring sealed crowns to assure watertight integrity. Dacor carries one quartz-electronic watch and two automatic, self-winding watches (one of which is a woman's). All three come with full one year guarantees.

Gordon Shearer, Dacor Sales Manager, advises that the key to reliable performance of a dive watch lies with the customer. "One of the biggest causes of dive watch flooding is improper replacement of the screwdown crown." As Shearer explains it, "People unscrew the crown to set the time or date and then fail to get it back into place correctly. The watch is almost certain to flood if the crown is not all the way in."

Shearer went on to say that nearly all the better dive watches will give years of good service with proper care. "It's extremely important that any new dive watch owner thoroughly read the instruction sheet that comes with the watch. This will explain in step-by-step fashion how to get the longest life out of your watch." However, in the event that a problem should arise, Dacor maintains a complete repair facility with a turn-around time of about two weeks.

DIVETIME INDUSTRIES

Divetime Industries' solar-powered digital dive watch is probably the most unique watch for divers on the market today. In the words of company president Mike Donovan, "Our aim was to produce a watch totally sealed from outside elements. To that end we produced a watch that never has to be reset or opened for any reason."

The inner workings of Divetime's Dive-master watch are cushioned in a non-hardening silicone gel and completely sealed in a tough Lexan module. The watch is thus shock and pressure resistant and impervious to outside elements. The Divemaster batteries are recharged by solar energy, and the digital display time/date is programmed until the year 2100. The watch never has to be reset or opened for cleaning, servicing, or battery replacement.

The Divemaster is unconditionally guaranteed for two years. And the guarantee can be extended to 10 years for an additional \$10. The watch comes in one size and is suitable for use by both men and women.

SCUBAPRO

Scubapro carries one dive watch which is available with either a black or white self-cleaning, one-way ratcheted bezel. The watch is Swiss-made, has a 17 jewel self-winding movement, a special recessed mineral crystal and is guaranteed for one year.



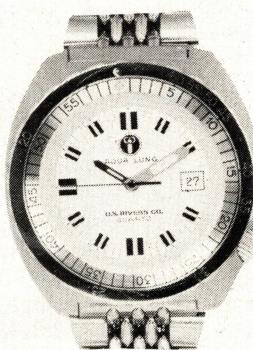
64-212
Subtronic Quartz

64-411
Gold Ladies' Quartz
SUBMAREX

63-111
1000 Automatic



7335



7336
U.S. DIVERS



7337

Mike Brock, Scubapro's National Sales Manager, said, "Our watches are sold through Scubapro dealers around the world and our guarantee is recognized worldwide."

In the U.S., all servicing of Scubapro watches is handled through the House of Clocks in Los Angeles. After a complete service and repair — which entails cleaning the entire mechanism and replacing all seals — the House of Clocks extends the guarantee for another year.

To prolong the life of a dive watch, Brock recommends that it be worn under the wetsuit sleeve, rather than strapped to the outside. To check the time, the diver simply pulls back the sleeve. "A dive watch is a fairly high priced item," maintains Brock, "it would seem that divers would want to take care of them."

SUBMAREX

The people at Submarex, the U.S. division of the Swiss-based dive equipment company, General Diving, are understandably proud of their line of dive

watches. According to Hal Watts, Marketing Director at Submarex in Florida, "Submarex uses the highest grade of stainless steel available on the market today for our watch housings. And our quartz movements are the most accurate to be found anywhere. Yet, we are able to offer them at a reasonable price."

All Submarex dive watches have screwdown crowns with recessed scratch-proof mineral crystals. The one-way ratcheted bezels are hard chrome plated stainless steel with a self-cleaning action to expel trapped grit. Submarex offers the standard one year guarantee and, according to Watts, "Should a Submarex watch owner have any difficulty with his dive watch, we will simply replace it."

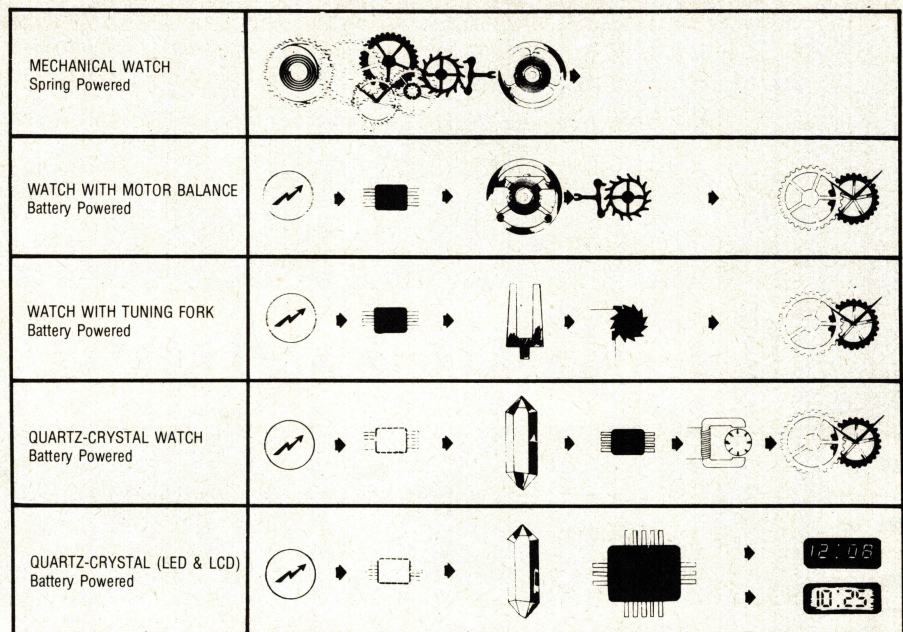
For long-term storage of a quartz watch, Watts suggests that divers pull the stem out far enough to disengage the battery. This will prolong the life of the quartz movement.

U.S. DIVERS

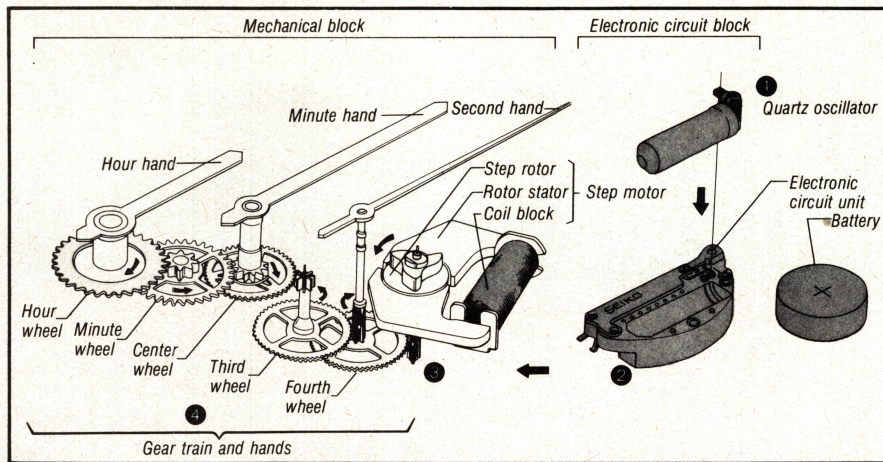
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SCUBAPRO
40-425 40-425



FIVE DIFFERENT TYPES OF WATCHES



In simplified form, the diagram above differentiates between the types of watches available today. The diagram at left shows the structure of an analog quartz watch. The analog quartz has fewer jewels than a mechanical watch because there are fewer parts. Also, the pressure placed on these parts is not as great as that exerted on the bearings of a mechanical watch.

mechanically operated dive watches for several years, the U.S. Divers Company, headquartered in Santa Ana, California, now carries its own line of Swiss-made quartz watches. The new quartz battery is designed to operate up to three years and is guaranteed accurate to one minute per year. Parts and workmanship are guaranteed for one year and an optional five year warranty is also available. To maintain the optional warranty, the owner should send the watch in for cleaning and servicing once a year. The fee for this is \$15.

All U.S. Divers watches have an offset screwdown crown (offset to protect the diver's wrist), a one-way ratcheted bezel with no decompression limits, and a mineral crystal. Also, a special screwdown indicator shows the diver that the crown is securely fastened.

To protect the precision movement of any dive watch, Marketing Manager Grady Fort warns, "It's not a good idea to take a hot shower while wearing your dive watch. The hot, soapy water may pene-

trate the seal and fog the watch. This is especially true for quartz watches."

U.S. Divers offers a complete repair service for their watches, with a turn-around time of about three days.

HELPFUL HINTS

There's a lot to consider before purchasing a dive watch. First of all, you must determine how much you can afford to spend. Secondly, how much wear and tear will your watch undergo: Are you a snorkeler, a shallow water diver, an occasional decompression diver, a frequent decompression diver? In other words, what are your basic needs? And where do you dive — frigid waters, tropical seas, temperate zones?

Next, you've got to make your biggest decision — will you choose a quartz, battery-powered watch or a mechanical, spring-powered one? You can readily see that the current trend by many manufacturers is toward quartz analog watches. Yet Rolex, a leading name in underwater timepieces, retains the me-

chanical movement.

Another consideration is the crystal. Do you want a mineral glass crystal or one made of plastic glass?

A *must* in underwater watches, in this writer's opinion, is the recessed, screw-down crown, which most manufacturers are featuring now. Another very important consideration is the service. Check your warranty thoroughly before buying — know exactly what the service plan offers. Style should be considered, too, but don't be an impulse buyer like a friend of mine — he chose a new car solely because of its "gorgeous lines!"

In conclusion, you might talk to other divers in your area, especially those who are respected and experienced. Talk to your local dive shop manager or jewelry proprietor, too.

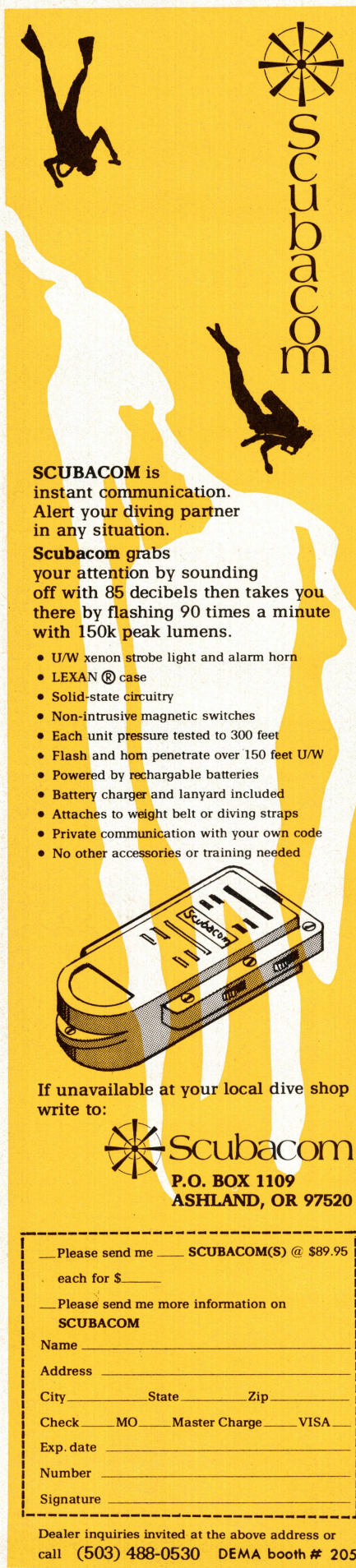
Gather your information, check out the merchandise and make your decision. Then you'll be just in time to join the millions of divers throughout the world who are dependent upon and enjoying the most important dimension in diving. »

sdm's guide to DIVE WATCHES

MANUFACTURER	MODEL	POWER	CRYSTAL	CASE	RECESSED CROWN	PRESSURE TESTED TO	ROTATING BEZEL	DIAL COLOR	LIMITED GUARANTEE	WOMEN'S OR MEN'S	RETAIL *PRICE
Aquadive 3600 Wilshire Blvd. Los Angeles, CA 90010	1064	Battery	Mineral	Stainless	No	220'	Yes	Blk/Wh. Blue or Orange	1 Year	Men's	\$ 235.00
	952Q	Quartz	Mineral	Stainless	Yes	660'	Yes	Silver	5 years	Men's	\$ 170.00
	872Q	Quartz	Mineral	Stainless	Yes	660'	Yes	Black	5 years	Men's	\$ 170.00
	874Q	Quartz	Mineral	Stainless	Offset	660'	Yes	Black	5 years	Men's	\$ 170.00
	839Q	Quartz	Lucite	Stainless	Yes	660'	Yes	Blue or Blk.	5 years	Men's	\$ 156.00
	918Q	Quartz	Lucite	Stainless	Yes	660'	Yes	Black	5 years	Women's	\$ 230.00
	980A	Mechanical	Lucite	Stainless	Yes	660'	Yes	Gold	1 year	Men's	\$ 230.00
	614A	Mechanical	Lucite	Stainless	Yes	660'	Yes	Black	1 year	Women's	\$ 158.00
	470A	Mechanical	Lucite	Stainless	No	660'	Yes (non-ratchet)	Red, Gray, or Blue	1 year	Men's	\$ 118.00
	91809	Quartz	Plastic	Stainless	No	666'	Yes	White	1 year	Men's	\$ 225.00
Bulova Watch Co., Inc. 7520 Astoria Blvd. Jackson Heights, NY 11370	91810	Quartz	Plastic	Stainless	No	666'	Yes	Black	1 year	Men's	\$ 225.00
	91826	Quartz	Plastic	Stainless	No	333'	Yes	Black	1 year	Men's	\$ 225.00
	12690	Mechanical	Plastic	Stainless	No	333'	No	Silver	1 year	Men's	\$ 140.00
	11690	Mechanical	Plastic	Stainless	No	666'	Yes	Black	1 year	Men's	\$ 110.00
	12503	Mechanical	Plastic	Stainless	No	666'	Yes	Black	1 year	Men's	\$ 195.00
	12674	Mechanical	Plastic	Stainless	No	333'	No	Silver	1 year	Men's	\$ 135.00
	42556	Mechanical	Plastic	Stainless	No	666'	Yes	Black	1 year	Men's	\$ 84.95
	42554	Mechanical	Plastic	Stainless	No	666'	Yes	Black	1 year	Men's	\$ 79.95
	42553	Mechanical	Plastic	Stainless	No	666'	Yes	White	1 year	Men's	\$ 79.95
	42555	Mechanical	Plastic	Stainless	No	666'	Yes	White	1 year	Men's	\$ 84.95
	12675	Mechanical	Plastic	Stainless	No	333'	No	Brown	1 year	Men's	\$ 135.00
	12553	Mechanical	Plastic	Stainless	No	333'	No	Champagne	1 year	Men's	\$ 110.00
	12678-9Y	Mechanical	Plastic	Stainless	No	333'	No	Silver	1 year	Men's	\$ 145.00
	3007	Mechanical	Plastic	Stainless	Yes	660'	Yes	Blue	1 year	Men's	\$ 150.00
	3507	Mechanical	Plastic	Stainless	Yes	660'	Yes	Blue	1 year	Women's	\$ 160.00
	3107	Quartz	Plastic	Stainless	Yes	660'	Yes (non-ratchet)	Red/Black	1 year	Men's	\$ 155.00
	3203	Quartz	Mineral	Stainless	Offset	660'	Yes	Blue	5 years	Men's	\$ 240.00
	3207	Quartz	Mineral	Stainless	Protected	990'	Yes	Black	5 years	Men's	\$ 220.00
	3807	Quartz	Mineral	Stainless	Protected	990'	Yes	Black	5 years	Women's	\$ 220.00
Chronosport, Inc. 119 Rowayton Ave. Rowayton, CT 06853	3407	Quartz	Mineral	Base Metal Gold Plated	Yes	990'	Yes	Gold	5 years	Men's	\$ 295.00
	3907	Quartz	Mineral	Base Metal Gold Plated	Protected	990'	Yes	Gold	5 years	Women's	\$ 295.00
	3304	Quartz	Mineral	Stainless Black Chromed	Yes	990'	Yes (special lift & lock)	Black	5 years	Men's	\$ 290.00
	3307	Quartz	Mineral	Base Metal or S/S Black Chromed	Protected	330'	Yes	Black	5 years	Men's	\$ 370.00
	728	Mechanical	Mineral	Stainless	Yes	660'	Yes	Dark Green	Lifetime	Men's	\$ 140.00
Cressi-Sub 677 SW 1st St. Miami, FL 33130											

729	Mechanical	Mineral	Stainless	Yes	660'	Yes	Dark Green	Lifetime *	Women's	\$ 140.00
Dacor Corp. 161 Northfield Rd. Northfield, IL 60093	UWM1	Quartz	Sapphire	Offset	3300'	Yes	Black	1 year	Men's	\$ 335.00
	UWM2	Mechanical	Plexiglass	Protected	825'	Yes	Black	1 year	Men's	\$ 186.00
	UWL1	Mechanical	Mineral	Offset	825'	Yes	Jade	1 year	Women's	\$ 199.00
	Divemaster	Solar Energy	Lexan	No	750'	No	Red	2 years	One Model	\$ 129.95
Heuer U.S. Distributor Princeton Technologies, Box 764 Hightstown, NJ 08520.	756	Mechanical	Mineral	Protected	660'	Yes	Black	1 year	Women's	\$ 165.00
	844	Mechanical	Mineral	Protected	660'	Yes	Black	1 year	Men's	\$ 155.00
	8440	Quartz	Mineral	Protected	660'	Yes	Black	1 year	Men's	\$ 205.00
	551300	Mechanical	Plastic	Yes	660'	Yes	Black	1 year	Men's	\$ 715.00
Rolex 665 Fifth Ave. New York, NY 10022	551200	Mechanical	Plastic	Yes	660'	Yes	Black	1 year	Men's	\$ 845.00
	168000	Mechanical	Plastic	Yes	660'	Yes	Black	1 year	Men's	\$ 895.00
	168080	Mechanical	18K Gold	Yes	660'	Yes	Black, Blue	1 year	Men's	\$6150.00
	166500	Mechanical	Plastic	Yes	2000'	Yes	Black	1 year	Men's	\$ 945.00
	T940100	Mechanical	Plastic	Yes	660'	Yes	Black	1 year	Men's	\$ 440.00
	T941100	Mechanical	Plastic	Yes	660'	Yes	Blue	1 year	Men's	\$ 460.00
	T909100	Mechanical	Plastic	No	330'	Yes	Blue, Black	1 year	Men's & Women's	\$ 395.00
	T912100	Mechanical	Plastic	No	165'	Yes	Silver, Blue	1 year	Men's	\$ 395.00
	T932300	Mechanical	Plastic	No	165'	Yes	Silver, Blue	1 year	Women's	\$ 420.00
	40-425	Mechanical	Mineral	Protected	1650'	Yes (white or black)	Black	1 year	Men's	\$ 500.00
	60583	Quartz	Mineral	Offset	2000'	Yes	Black	1 year	Men's	\$ 595.00
	60585	Quartz	Mineral	Offset	1000'	Yes	Black	1 year	Men's	\$ 350.00
Seiko Corp. of America 555 W. 57th St. New York, NY 10019	60595	Quartz	Mineral	Offset	500'	Yes	Orange	1 year	Men's	\$ 250.00
	60597	Quartz	Mineral	Offset	500'	Yes	Blue	1 year	Men's	\$ 250.00
	XP007	Quartz	Mineral	Protected	500'	Yes	Black	1 year	Women's	\$ 195.00
	DE095	Mechanical	Mineral	Offset	500'	Yes	Black	1 year	Men's	\$ 165.00
	ZP249	Mechanical	Mineral	Protected	500'	Yes	Black	1 year	Women's	\$ 145.00
	ZP251	Mechanical	Mineral	Protected	500'	Yes	Orange	1 year	Women's	\$ 145.00
	63-111	Mechanical	Mineral	Protected	1000'	Yes	Black	1 year	Men's	\$ 285.00
	63-112	Mechanical	Mineral	Protected	1000'	Yes	Black	1 year	Men's	\$ 285.00
	64-211	Quartz	Mineral	Protected	1000'	Yes	Black	1 year	Men's	\$ 295.00
	64-212	Quartz	Mineral	Protected	1000'	Yes	Black	1 year	Men's	\$ 295.00
	64-312	Quartz	Mineral	Protected	600'	Yes	Black	1 year	Men's	\$ 224.00
	64-411	Quartz	Mineral	Protected	600'	Yes	Black	1 year	Women's	\$ 260.00
Submarex 500 W. 18th St. Hialeah, FL 33010	7335	Quartz	Mineral	Protected	900'	Yes	Blue	1 year	Men's	\$ 299.95
	7336	Quartz	Mineral	Protected	900'	Yes	Silver	1 year	Men's	\$ 299.95
	7337	Quartz	Mineral	Protected	900'	Yes	Black	1 year	Men's	\$ 299.95
	7338	Quartz	Mineral	Protected	900'	Yes	Orange	1 year	Men's	\$ 299.95
U.S. Divers Co. 3323 W. Warner Ave. Santa Ana, CA 92702	7335	Quartz	Mineral	Protected	900'	Yes	Blue	1 year	Men's	\$ 299.95
	7336	Quartz	Mineral	Protected	900'	Yes	Silver	1 year	Men's	\$ 299.95
	7337	Quartz	Mineral	Protected	900'	Yes	Black	1 year	Men's	\$ 299.95
	7338	Quartz	Mineral	Protected	900'	Yes	Orange	1 year	Men's	\$ 299.95

*These are the retail prices at presstime. They are subject to change due to the fluctuating world money market.



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Signature _____

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Medifacts

BY CHARLES V. BROWN, M.D.

SWIMMER'S EAR

Infection of the ear's external canal is a familiar affliction of aquatic people, divers included. Indeed, it is commonly called swimmer's ear, and its incidence is in proportion to the amount of time spent wet. Divers vary in susceptibility, and some seem immune, but few really are. Warm water and moist air increase the risk. Saturation divers, who divide their time between water and moist air, practically always succumb unless preventive measures are taken. Dr. Edward Thalmann of the U.S. Navy has recently reported on just such a prophylactic regimen. It was developed at the Experimental Diving Unit, and has been adopted by the Navy. He suggested that we do this update review.

Properly called otitis externa, swimmer's ear got its common name because of the way most cases develop. What happens is that the skin's protective wax layer is washed away, and with it the acid residues of perspiration. The skin absorbs water and softens, and its pH (a measure of acidity) shifts to the alkaline side. This alkaline shift inhibits the good guy germs that live on and possibly help protect normal skin, allowing bad guy germs to take over. The bad guys are pathogenic — they invade and infect the skin. The result is itching, burning, pain, swelling, and discharge, usually within two to four days. A confirming sign is tenderness — it hurts to pull on the ear lobe.

Preventive measures take four forms: 1) excluding water from the ear canal, 2) drying the ear after diving, 3) instilling agents that kill germs, 4) keeping the pH on the acid side. Excluding water is no problem for swimmers — they need only wear ear plugs. For divers, hard hat rigs will keep water out. Those who use conventional scuba, however, have a problem. One solution is the Scuba Queen hood, which equalizes pressure in the external ear with air from the regulator instead of ambient water. Another is to fill the canal with a non-aqueous liquid that keeps water out. Mineral oil retained by a cotton plug has been suggested. Dr. Murray Grossan has designed a gadget to fill the canal with a silicone material. These approaches work, but probably for reasons of cost and convenience have not really caught on.

For early drying, it's essential to have clean ear canals. Accumulations of excess wax and dead skin retain water, and when wet, support bacterial growth. People who dive frequently have clean ears — the ocean sees to it. Others can find out by having an oto-

scope exam. An otoscope is a flashlight for looking into ears, with a magnifying lens to make things show up better. With some training, anyone can learn to use it. Dr. Thalmann suggests that a second-hand otoscope might be a good investment for dive clubs that make long trips. When the exam shows junk in the ear, it can usually be removed by gentle irrigation with lukewarm water, using a rubber bulb syringe.

For faster drying, one can blow warm air at the ear, or instill a dehydrating agent. Dr. Thalmann feels that the use of a hair dryer as recommended in SDM's Scuba Quiz is ineffective, since warm helium tried by Navy saturation divers proved of little avail. He considers hair dryers hardly practical for sport divers anyway. We think his first point not necessarily valid for sport divers, since they're not re-exposed to a humid environment right after drying. We fully concur with his second point. Dr. Joseph Farmer, in the text *Diving Medicine*, does recommend drying an ear by blowing a small stream of compressed air into the canal, or if the drum is ruptured, by wiping with cotton and then sucking air out through a tube inserted into the canal. These techniques require equipment and expertise usually found only in a doctor's office.

Alcohol has been the favored dehydrating agent, but has the disadvantage of dissolving the wax coat. To minimize this, instead of rinsing the canal with alcohol, instill a drop or two every few minutes. That way it will evaporate and leave the wax behind. Dr. Allen J. Ryan, editor of *The Physician and Sportsmedicine*, prefers glycerin. He advises that people prone to swimmer's ear instill three drops after swimming or showering. A small cotton plug inserted and left for an hour completes the treatment, drying the ear without irritation.

Easier and more popular than trying to dry the ear is putting in antibiotic drops. This too has disadvantages. They require a prescription, they destroy good germs along with the bad, and their prolonged use favors overgrowth of infectious micro-organisms resistant to the medication. It's wiser not to rely upon antibiotics for prevention, but to reserve them for treatment of established infections.

Maintaining an acid pH seems to be the safest, most reliable, and least expensive way to prevent swimmer's ear that has found common acceptance. Acid-alcohol preparations are advocated by many authorities. Dr. Alex Weiss-

(Continued on Page 34)

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A black and white photograph of a man in a wetsuit standing on a large piece of driftwood on a rocky shore. He is looking off to the side with a smile. In the background, there are trees and a body of water.

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SDM SCUBA QUIZ



Category: Dive Watches

By Dennis Graver

A high percentage of experienced divers own dive watches, yet I frequently wonder how many of them know how to use and care for the devices properly. A dive watch is an important and useful item of equipment, but must be used correctly to be of value. Test your knowledge of dive watches by answering the following questions. Answers are on the next page.

1. The single, most important reason for a diver to have a watch is to:

- ☐ A. Keep track of dive time
- ☐ B. Keep track of bottom time
- ☐ C. Keep track of surface intervals
- ☐ D. Be identified as a diver

2. The preferred type of winding mechanism for a dive watch is:

- ☐ A. Manual
- ☐ B. Manual with a screwdown crown
- ☐ C. Automatic
- ☐ D. Electric

3. Select the most desirable feature for a dive watch:

- ☐ A. No decompression limits integrated
- ☐ B. Click stops
- ☐ C. Luminous markers
- ☐ D. Left-turning ratchet mechanism

4. When diving, your watch should be set _____, and the elapsed time noted _____.

- ☐ A. Upon reaching the bottom, upon reaching the surface
- ☐ B. Upon entering the water, upon exiting the water
- ☐ C. Immediately before descent, immediately after ascent
- ☐ D. Immediately before descent, immediately before ascent

5. The primary advantage of a mineral crystal on a dive watch is that it:

- ☐ A. Is scratchproof
- ☐ B. Is anti-magnetic
- ☐ C. Is able to withstand great pressures
- ☐ D. Magnifies the face of the watch

6. The least desirable point of attachment for a dive watch on a diver is:

- ☐ A. On the console
- ☐ B. Next to a compass on the wrist
- ☐ C. Next to a depth gauge on the wrist
- ☐ D. On the wrist with no other gauges

7. When condensation appears on the inside of the crystal of a dive watch, the watch should be:

- ☐ A. Baked at 250 degrees
- ☐ B. Opened, rinsed with alcohol, and dried
- ☐ C. Discarded
- ☐ D. None of the above

8. The primary disadvantage of nearly all dive watches is that they are:

- ☐ A. Subject to leakage
- ☐ B. Passive devices
- ☐ C. Expensive
- ☐ D. Bulky

9. Proper maintenance of a dive watch includes:

- ☐ A. Bi-annual cleaning and lubrication
- ☐ B. Freshwater soaking after use in salt water
- ☐ C. Minimal exposure to chlorinated water
- ☐ D. All of the above

SDM SCUBA QUIZ



Answers: Dive Watches

1. B. Keep track of bottom time. The length of time one can remain at a given depth is limited due to nitrogen absorption in the body. No decompression limits must not be exceeded. A timing device is essential to help assure time at depth is kept within safe limits.

2. C. Automatic. Self-winding watches have advantages of not requiring batteries and not requiring frequent turning of the crown, which can cause O-ring wear and leakage. The less the stem is used, the greater the odds are that the watch will retain its waterproof integrity.

3. D. Left-turning ratchet mechanism. This is called a "safety bezel," because if it is moved inadvertently during a dive, the elapsed time indicated can only be made to increase, not decrease. Thus, a diver could not exceed safe time limits because the bezel had been moved in an unsafe (right-turn) direction.

4. D. Immediately before descent, immediately before ascent. The whole idea of a dive watch is to keep track of bottom time, which begins when you leave the surface and ends when you leave the bottom in a direct ascent to the surface. I seldom see divers with watches remember to set the bezel prior to descent. I used to forget myself until I made a concentrated effort to remember it often enough to make it a habit.

5. A. Is scratchproof. Divers bump into all kinds of hard, rough objects, and most dive watches have badly scratched crystals. A watch with a mineral crystal can look nearly new after years of use. After owning several dive watches, I strongly recommend one with a mineral crystal because of the rough environment of diving.

6. B. Next to a compass on the wrist. A watch can cause deviation of the compass reading and result in an incorrect heading. Even stainless steel, anti-magnetic watches have some effect on the compass (try it!), and if the watch itself doesn't, the watch band may. I prefer to have the watch and depth gauge next to each other where they can be referenced together.

7. D. None of the above. Condensation usually forms on the inside, center of the crystal because that's the coolest part of the watch when it is being worn. The moisture obviously indicates leakage, so service is in order as soon as possible.

8. B. Passive devices. A dive watch does absolutely no good if you forget to set it or to look at it while diving. It will not announce to you that the allowed time has elapsed. You must make an effort on each dive to remember to check the time of the dive. It takes determined practice to be able to do this. New electronic devices, that are active and audibly remind the diver of time limits, may overcome the disadvantage of the dive watch.

9. D. All of the above. O-rings dry out, get dirty, and wear. Strong chlorine in pool water is especially harsh on O-rings and dive watches should never be worn while bathing. At least once every two years the watch should be cleaned and lubricated. This is much cheaper than the cost of servicing the watch if it should leak due to improper maintenance.

I hope that you scored well on this exam, particularly if you own a dive watch! Hopefully, you picked up a tip or two to help you in selecting or caring for a watch. There are other timing devices available for keeping track of bottom time. They are pressure activated, which is an excellent feature, because you don't have to remember to set them before descending (but you do have to reset them before the next dive) and you don't have to check them at the end of the dive. Equipment advances are gradually taking the effort out of diving and increasing the safety and enjoyment. Congratulations to all the dive manufacturers who strive toward this end.

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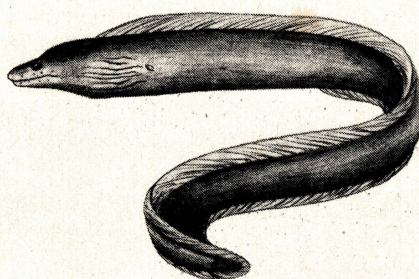


The California Moray

(*Gymnothorax mordax*)

Much of the talk about moray eels is concentrated on their teeth. Because of its fangs, the moray is the subject of tall tales, creates visions of sea monsters and stirs up horror stories of mean and ferocious beasts. The bad publicity is undeserved. Because the fang-filled mouth opens and closes constantly, it may seem to be a threat. However, this is only the animal's way of breathing. The moray is actually quite shy and remains hidden in the crevices of the reef by day, venturing out to feed at night. □ Experienced California divers know that morays don't attack unless provoked.

They also know that morays often hide in the same places as lobsters and will never reach into a dark hole without carefully surveying it first. A moray will bite in defense, and the bite can be nasty. However, the animal will not hang on, as some would believe. The scientific word *mordax* means "prone to bite," but in actuality, the moray would rather hide. □ The moray is not a true eel, but an eel-like fish belonging to the family *Muraenidae*. Muraenids are found in rock and reef areas around the world, with at least ten species of the family in the Bahamas and only one in California. The Muraenids are different from most other eels in that they don't have pectoral fins. The gill openings are small and round. Aspects of their teeth and nostrils also differentiate them from other eel families. The California moray (*Gymnothorax mordax*) is dark brown or green with white spots scattered over its body. Its leathery



skin is scale-less; *gymnothorax* means "naked breast" in reference to this. □ The California moray usually lives in rocky kelp areas but is found in depths down to 130 feet. It ranges from Point Conception (north of Santa Barbara) south to Magdalena Bay in southern Baja. The animal is a scavenger and predator, locating its food by its sense of smell. The moray feeds on shrimp and mollusks such as octopus, mussels and clams. If a diver takes an abalone that is later replaced on a rock, the moray is likely to come out of hiding and tear into it. Morays are also known to get into lobster traps. □ The Muraenids

have a long history; moray teeth have been found in Indian middens along the coast of California, and they have also been unearthed in one Pleistocene deposit that was estimated to be nearly two million years old. The animals themselves live to a ripe old age. Two individuals (named Moray and Mi-

randia) survived in an aquarium at Scripps for 27 years, and one old individual reportedly reached a length of 47½ inches. The California moray is said to reach five feet, but this is rare. More likely, maximum size will be two to three feet. Young morays of about a foot in length have a lot of yellow in their coloring. The pre-juvenile muraenids go through a pelagic larval period, called the leptocephalus stage. At this time they are transparent, ribbon-like larva, floating in the open ocean currents until they settle down on the reef to grow into recognizable juveniles. »

Photo By Howard Hall - Text By Hillary Hauser

The photo was shot in 30 feet of water off Los Coronados Islands, Mexico. Hall used a Nikon F-2 with a 55mm lens in an Oceanic housing, two SR2000 strobes. ASA 64 shot at f11, 1/60 second, 12 inches from subject.

MEDIFACTS

(Continued from Page 26)

kopf, an ear specialist involved in diving medicine, uses boric acid-alcohol. The Teklite II saturation divers were provided with a solution of 5 percent acetic acid and 5 percent tannic acid in 50 percent alcohol, instilled after the last dive of the day, and left in the ear for two minutes. The infection rate was 9 percent for those who used it as directed, and 64 percent for those who did not. Some pharmacies and dive shops sell without prescription an acid-alcohol preparation called Swim-Ear. The advantage of the alcohol in these products is that it is both a germicidal and a drying agent. This is fine for occasional use, but for frequent use may be outweighed by the removal of wax faster than the skin can replace it.

Of the acid preparations that do not contain alcohol, the best known are Domeboro Otic, which has acetic acid in aluminum acetate, and VoSol Otic, a non-aqueous solution of acetic acid. Dr. Thalmann's study showed the Domeboro formulation to be 100 percent effective for preventing otitis externa in saturation divers, provided that it was properly applied. Proper application meant filling each ear in turn with the solution and keeping it tilted upward to ensure five minutes of contact time. This was done

each morning and evening, and also after each water exposure. Even if diving were limited to once daily, that would add up to thirty minutes of head tilting or lying on one's side. Joe Diver could easily do this, but somehow we don't believe that he will. Maybe he'd go for a cotton plug what would hopefully retain the solution well enough to do the job.

Another study, performed by Hutchinson and Wright at Brigham Young University in 1975 used guinea pigs to compare the protective efficacy of various preparations. These were used on two consecutive days, apparently with no special effort to ensure any particular contact time. Beginning on the third day, the ears were kept wet and no further treatment was applied. In this study, VoSol fared better than Domeboro, but best of all was something called 360 Medical Fluid, a silicone preparation made by Dow Corning. It protected the ears several days longer than anything else, presumably by coating the canal and preventing water contact.

So what do we advise? Clean ears, for sure. Beyond that, since Joe Diver is not into saturation, any of the methods will probably work. A person highly susceptible to infection might try the new Navy regimen, using either Domeboro, VoSol, or vinegar. Vinegar, which is a five percent solution of acetic acid, is the cheap way to go, and one can have acid-alcohol ear drops by simply adding an equal

part of ethyl or isopropyl alcohol. As each ingredient dilutes the other, however, this may not be as effective as a commercial product. We prefer not to put alcohol into an ear before a dive. There's no infection to kill, the drying effect is obviously wasted, and you want to preserve the wax film as long as possible. It would be rational to use acid alone before and between dives, and acid-alcohol after the day's final dive.

Treatment of swimmer's ear is essentially a more vigorous application of the same measures used for prevention, though severe cases may call for antibiotic drops and/or capsules, and sometimes a steroid hormone. Keep in mind, however, that not all otitis externa is the same, and neither is optimal treatment. What worked for your buddy, or his cousin, may not be best for you.

Most cases involve a gram negative bacterium like *Pseudomonas* supplanting the normal gram positive residents of the ear, but sometimes other agents are to blame. Hot climates favor the fungus *Aspergillus niger*, recognized by black powdery stuff in the ear. The yeast *Candida albicans* may crop up following over-treatment with antibiotics. Occasionally the basic problem is an allergy, or a contact dermatitis, or a skin disease such as seborrheic dermatitis. These are easily complicated by infection, and they don't go away when the infection is treated. Allergic dermatitis may even be

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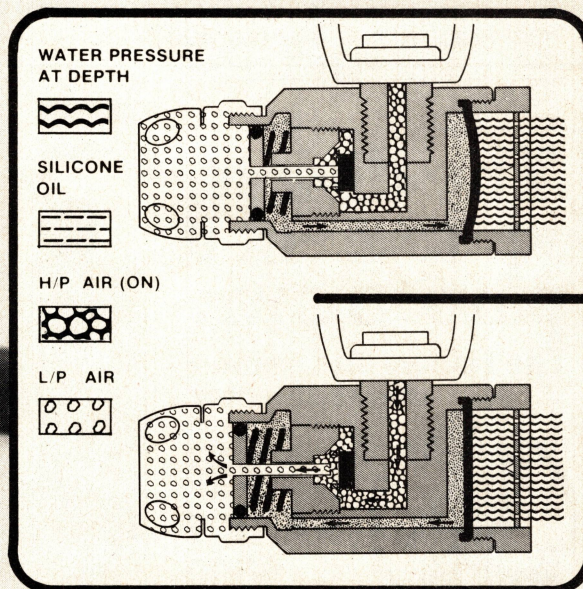
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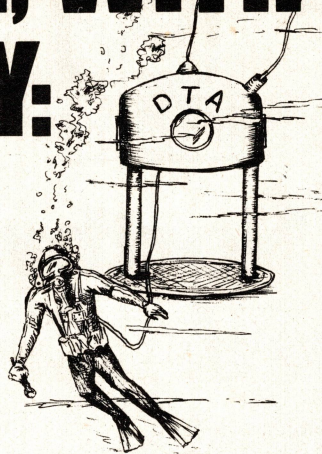
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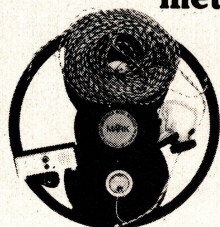
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MEDIFACTS

caused by treatment for infection. An abscess in a skin gland, called furunculosis, is still another possibility.

Finally, ear pain doesn't necessarily originate from the external canal. It can reflect middle ear squeeze or infection, or it can be referred from a strained or arthritic temporomandibular (jaw hinge) joint. Whenever simple remedies for swimmer's ear fail, you have either a severe or complicated case, or a wrong diagnosis, and definitely need medical attention.

READER QUESTIONS

Question: Wreck diver Thomas Mannon of Lancaster, PA is very safety minded. He has his regulator overhauled before each dive season, and he carries a totally redundant air supply — that is, a standard tank and a pony bottle, each with its own regulator. Once, when switching regulators underwater, he got a good shot of sand in his mouth and fears he may have inhaled some. He wonders whether that is possible, and whether inhaled sand would be gradually expelled with natural mucus, or would remain for life. There was no breathing difficulty or other symptoms after the dive.

Answer: People have inhaled sand, and saving their lives has required cleaning it out through a bronchoscope. But it would be impossible for a diver to inhale sand without inhaling sea water too, and if that happened, you'd know it. Normally water hitting the throat activates the swallowing reflex, and the epiglottis (the trap door that protects the windpipe) closes. If a bit of water got past the epiglottis, it would set off the cough reflex and be expelled. Maybe that's what happened to you. The absence of post-dive symptoms tells me that no significant amount of water or sand reached your lungs.

The lungs do have a self-cleansing mechanism. Everyone inhales tiny particles suspended in air, and these are trapped in the mucus sheet and propelled upward by the beating of cilia, and expelled by clearing the throat. Many sand grains would be too heavy for the mucus to hold, so would stay in the lungs. They could block small airways and cause alveolar collapse and infection. If the victim survived, they'd probably be encased in scar tissue and remain in the lungs for life.

There is an important lesson in this story. The use of a second regulator either as part of a redundant air system or an octopus rig is becoming common. The second regulator can be a hazard as well as boon and should always be secured, clipped to the tank harness or something else, and never be allowed to drag along behind.

(Continued on Page 64)

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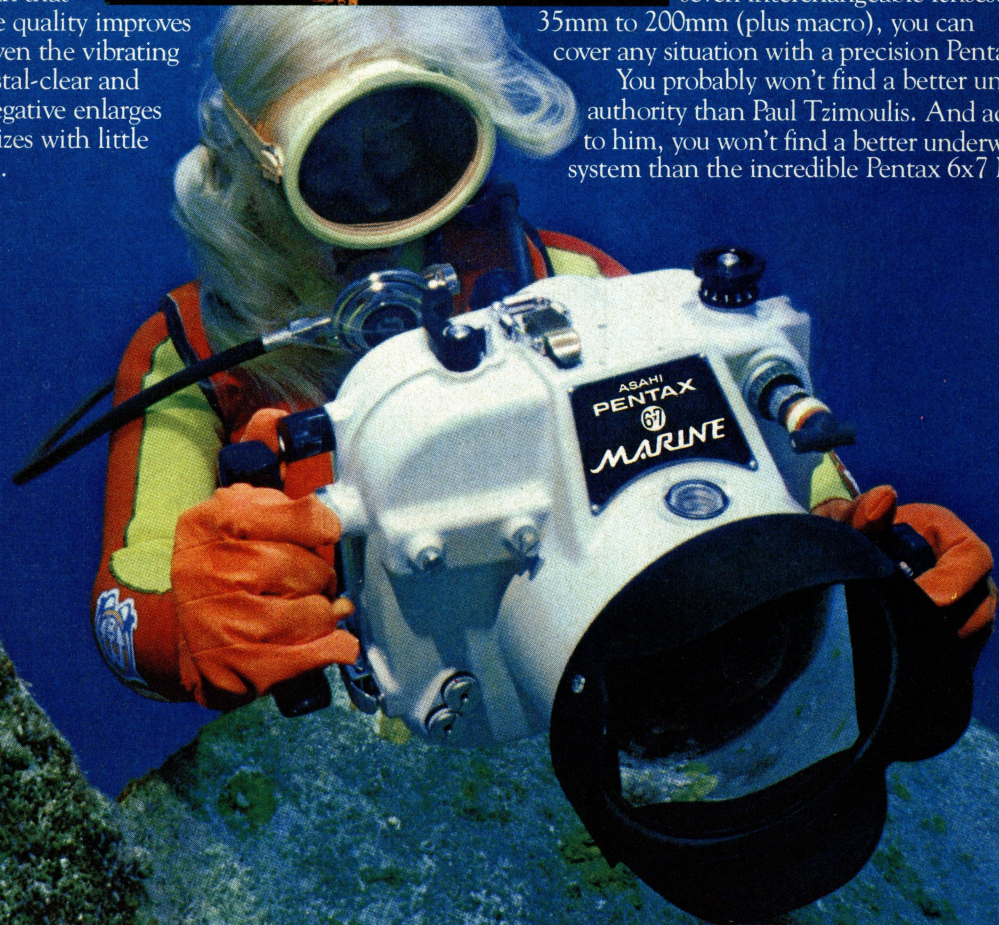
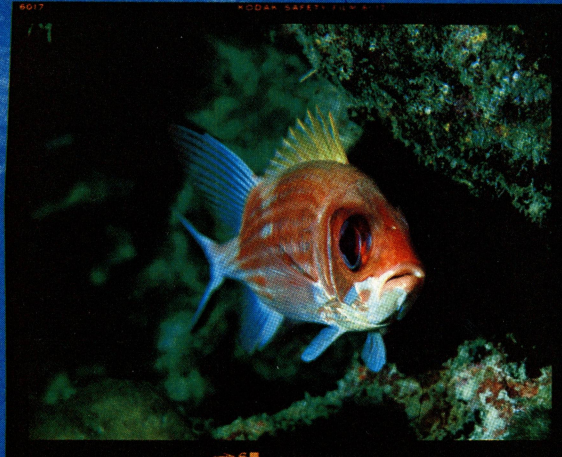
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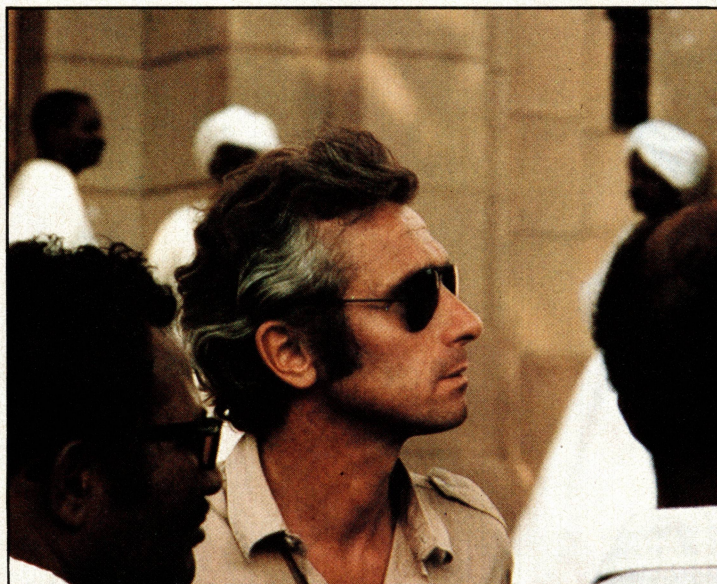
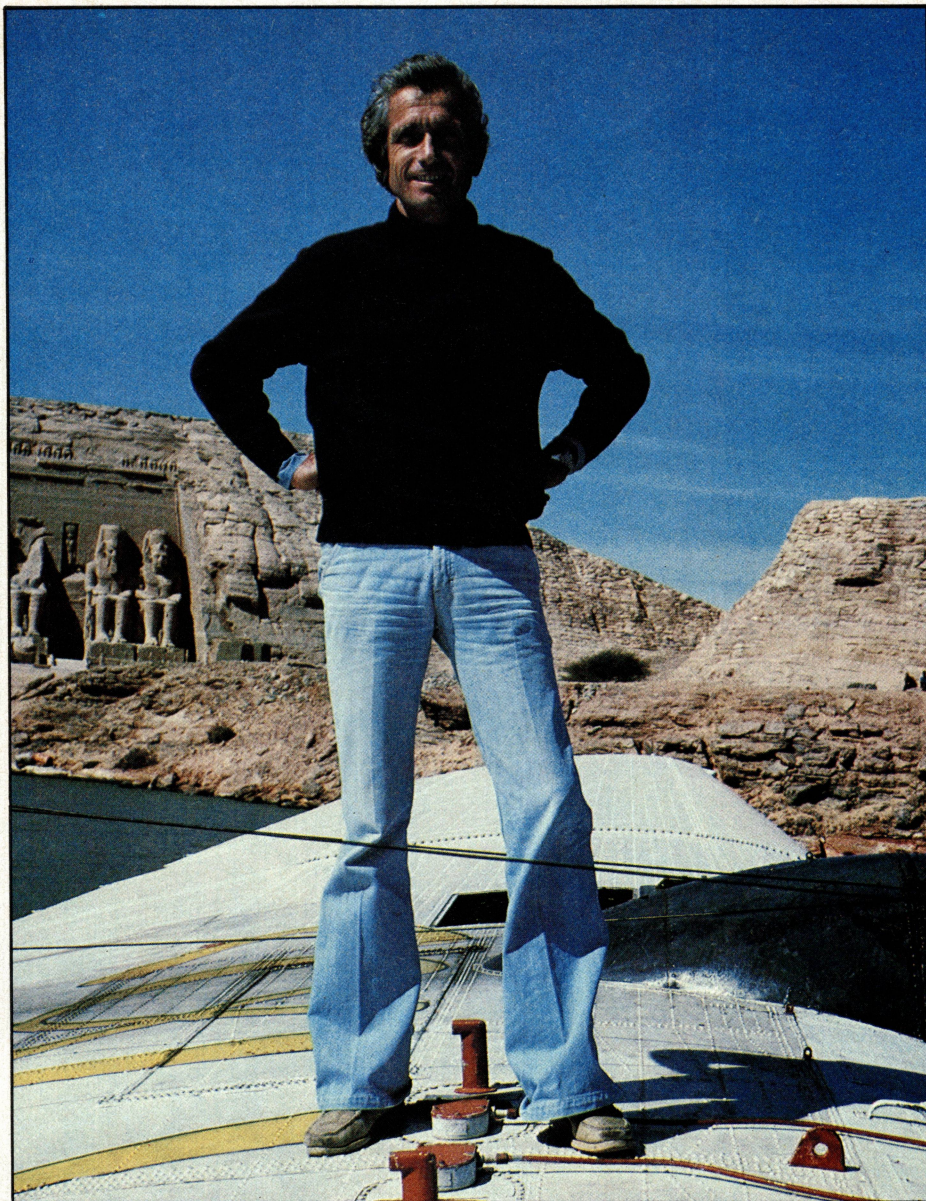
PENTAX®

PHILIPPE

SPIRIT OF CALYPSO



And now he is gone—
leaving us the legacy
of a spirit
that graced our lives
By Dr. Joseph B. MacInnis



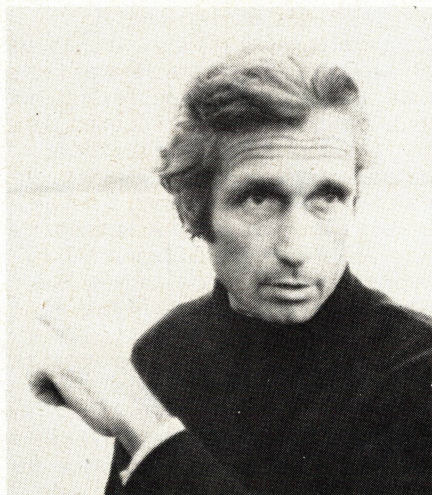
He is gone. And all of us who knew him feel the loss deeply. For he was more than a man, he was a spirit, a symbol of our time.

The news came while I was out at sea on a drillship, the *Discoverer Seven Seas*, 200 miles off the coast of Newfoundland. Standing in the radio room, reading the brief message of his death, I felt as if someone had drawn the oxygen out of the room.

In all of us runs a river of emotions, suddenly released when someone close is taken away. Numbness. Emptiness. The cold blur of anguish. And the wanting to reach out and comfort the survivors.

As the hours pass, the impossible thought burns, fades, then reappears, like ashes in the throat. Then the search begins, deep inside, tracing the memories, reaching out for some meaning, trying to comprehend not only what has happened, but the man himself — and the impact he had on our lives.

I first met him in 1968 in San Francisco.



photographs courtesy The Cousteau Society

We had both been invited to join the U.S. Navy's *Sealab III* program. He was tall, angular, and moved with an easy grace. You could tell at once that he was different, a young man whose dark beard and high cheekbones were out of place among the crewcuts and shaven faces of our Navy teammates. In the highly regimented, every-day-you-wear-a-uniform atmosphere, we were both foreigners and it drew us together.

He loved to poke fun at himself. In the military our uniforms were not what you would call glamorous. We were dressed in dull green, shortsleeved shirts with trousers that looked like stovepipes. "We look just splendid," he would say, glancing at himself in the full-length mirror. "Perhaps in time, we will come to grace the front cover of *Gentleman's Quarterly*."

He dove as if he had been exclusively designed for the sea. Underwater, he swam with animal economy, fins pulsing gently, lungs and body moving unbidden. Our first dives together were made during *Sealab*, but since this meant descending into the tar-black waters of San Francisco Bay, it wasn't as exciting as it first might seem.

Because *Sealab III* was to be operational at 600 feet, we had to wear several hundred pounds of complex equipment. This included hot water rubber suits ("our neoprene armour" he called it) and Kirby-Morgan Band Masks. Finally we were shackled into our breathing systems and life-support hoses. In less than an hour, we had changed from normal human beings to sea creatures with black rubber bodies and round fiberglass heads.

Heavily weighted, we waddle-walked to the edge of the jetty. There was a moment of silence as we stared through our steaming faceplates at the dark water fingering the piers.

Philippe, always eager to rid himself of the weight of the equipment, slipped in first. As the black seawater congealed around his shoulders and head, he always smiled. Once I even heard him laughing behind his helmet.

"It's unbelievable," he told me later, "we've spent the last 20 years trying to make man free in the sea. But for the past month, I've been anchored to the bottom with enough equipment to make Houdini shudder. My head's in a bowl, my fingers look like frankfurters, and three hoses as thick as saplings connect me to the surface. I have the mobility of a harnessed lobster. My father would love it."

To think of the son is to consider the father, Jacques-Yves, the "Grand Seigneur" of diving: The diver-philosopher who not only conceived of the Aqua-Lung, but gave it meaning and magic. Meeting him, you are stirred by the weathered texture of the face and the Gallic timbre of the voice. And his eyes, deep set like Philippe's, are the kind that follow you everywhere, like searchlights on the sea floor. This is a man of mystery, a man who has seen things and visited places that most mortals can only talk about.

This is the individual, yes, let us call him genius, who changed our concepts of the sea. In him, the separate worlds of land and water have been brought together in a new consensus. To look at him is to see a man with purpose — racing with time — trying to clarify crucial human relationships with the sea. Before it is too late.

As with all great men, it is difficult to define his essence. He seems to be a

spirit in transit, an unusual human being embarked on a singular voyage. On the way through, he has given us the unattainable: First, he led us into the sea with his Aqua-Lung, and then he brought the ocean into our living rooms.

He mastered television the same way he made his other breakthroughs — by surrounding himself with brilliant people — and following through with a sustained intuitive leap. The kind of mental effort made only by the young and daring. And he passed this love of risk, this joy of the gamble, on to his son.

In the classic sense of the word, Philippe was a Renaissance man. He was a diver, a sailor, a pilot, a photographer, a director — equally at ease behind the camera as in front of it.

He commuted between Europe and North America, fusing the best of both cultures in his work. He explored politics and philosophy and would offer his opinion, not always right, on subjects as diverse as Sartre and sailing. And right or wrong, being French, he was always forceful.

From a distance, Philippe seemed aloof. And often he was. But basically he was a shy person and it may have been that in his early days, he learned to smooth life's turbulence by moving in a calm, aristocratic way. Few people were really close to him, but those who were felt his flashes of intense warmth.

He represented, perhaps better than any single individual, the second generation of Aqua-Lung Men. If the major diving pioneers of the 1960's were Edwin Link, George Bond and Jacques Cousteau, then Philippe was foremost among those who followed in their footsteps. He was not an inventor as much as he was an interpreter, for undersea exploration had at last turned to looking at the implications of its new discoveries.

Philippe was a direct descendent of his father's unique ideas. But he was his own man, with his own ambitions and aspirations, and a certain knowledge of how to achieve things. And he would not hesitate to challenge his father in a toe-to-toe confrontation.

Philippe, when he was able, enjoyed a good time. He always worked hard, frequently stretching himself into seven days a week. But when he could, he entered into seldom-found hours of relaxation with his small circle of friends. And among his many honors, few gave him as much fun as his tongue-in-cheek role as "president" of the F & C Society. This small, loosely-organized club was formed on the spur of the moment by some of his American friends. It had no rules, no dues, no officers — the only obligation being "reasonable merriment

whenever possible." It was created by a group of individuals who were professionally productive and knew the risks, and humor, of their business.

The members were all active divers and included such diverse personalities as Stan Waterman, Al Giddings, Paul Tzimoulis and Frank Scallii. "Meetings" were held infrequently, but always across a table with a bottle of chilled Lancers. For several years, from Boston to San Francisco, usually at film festivals, or wherever two members happened to meet, the "Society" was in full swing.

The talk, warmed by the chance encounter and the glow of the wine, ranged around the world. It followed the contours of what each of us was doing in our corner of the ocean, what diving or filming projects were underway, and what was planned for the future.

Although Philippe was always moving faster than the rest of us — lecturing in the States, filming in the Pacific, putting the television series together in Los Angeles — he always made us feel that our work was as important as his. To him, we were all brothers, engaged in something significant, sharing a challenge. He knew, perhaps better than any of us, from experiences with his teammates on the *Calypso*, that we were held together by a love of the sea and an unspoken delight in the richness and adventure it gave our lives.

The "F & C Society" was born one Sunday in San Diego when a group of us gathered to watch the big powerboat races in Mission Bay. The afternoon was warm, a cool breeze blew off the Pacific, and it was easy for the six of us, including Philippe and his wife Jan, to enter the heated tempo of the race. Twelve big Unlimitees roared across the water only a few hundred feet away. They glistened in the waves, like low slung animals in screaming pursuit, hurling high roostertails of spray at the sun.

For two hours, we reveled in the howl and motion of the big engines, cheering when one of them was able to pass another, silent when our choice for the winner's circle came to a sudden sputtering stop. Despondent, we washed our mock sorrow away by opening another bottle of Lancers.

It was Philippe's kind of day. An ardent competitor, he loved the battles being fought out in front of us. He knew instinctively what was happening in the minds of those drivers as they cornered their big machines around the buoys and through the churning water. These were men engaged in a separate kind of intimacy with the ocean: throwing themselves over its surface, partially airborne, at speeds in excess of 100 miles an hour.

He sat quietly, his slim hand curled around his wine glass, those strange dark-winged eyes looking out over the battlefield. You could see that he pictured himself out there — driving — faster than the men behind those shuddering wheels.

Even as he sat there on the grass, motionless, he gave off the image of command. He wanted to encounter the world in a directly focused way, following the accord that existed between his mind and his body. Looking at him, you knew he wanted to be out on the edge of things, leading instead of following.

Some months later, in Los Angeles, he made a chance remark, the kind that circles inside the mind long after it has been spoken. We had been talking about Joseph Conrad's *Youth*, a classic story about a young man's early adventures at sea. I asked Philippe if he thought that diving might somehow allow us an extension of the health and vigor of our youth. He did not answer. Instead, he looked out across the city to the thin line where the sky joins the sea. "Being young isn't something," he said, "it is everything."

In spite of his own heavy schedule, which increased significantly after the formation of The Cousteau Society, he tried to keep up with other people's work. My own Arctic endeavors were no exception. Since 1970, I had been leading a series of expeditions to the Arctic Ocean to study the problems of working beneath the polar ice. It was dangerous, challenging work, but Philippe could, in a sentence or two, render it in another perspective. "It's ridiculous," he would say. "Anyone who dives in the polar ocean is crazy. If God had wanted us to swim in that Big Refrigerator, he would have given us the lungs of a seal and the skin of a polar bear."

One summer, he and Jan slipped away for a few days and joined us at the *Sublimnos* project in Lake Huron. We spent an afternoon diving down to the small manned station and exploring the clear cold waters that covered it. We finished by climbing up a tumbled rock face that led to the surface and the shore. He was shivering when he got out.

"Give me the Red Sea any time," he said through chattering teeth.

"Why?" I asked, puzzled. "A lot of us think this is pretty good diving."

"A Cousteau in cold water," he replied, "is one of the greatest moments in modern farce."

When I first met him, he rarely talked about his father. That would come later when he had matured and started to cast his own shadow. But one night when we were anchored together on a boat in

Georgian Bay, he fell silent. It was that magic moment just before the sun sets, when you can almost feel the slow spin of the planet. The lake was motionless and we could hear the faint voices of our wives coming from below. He looked on across the water to the great red sphere lowering itself into the lake.

"It wasn't easy growing up with him," he said. "I was always his son, never really myself. Often he made it harder. On purpose, I think, to see if I could handle the heat."

Those who aspire to greatness have a way of simplifying things. With a word or gesture they momentarily enlarge their insights for others to see. Their reductions, their conceptual simplifications, are born of having passed through experiences of great complexity, experiences that allow them to focus on the things that really matter. In his last years, Philippe was approaching this state.

I did not see him very often between 1975 and 1977. In those years, he was moving even more quickly, gathering responsibilities, filming, directing, immersing himself in the growing efforts of The Cousteau Society. He was like a pale streak on the horizon, fleeting, but throwing light into the dark corners of the sea. One month he would be taking pictures of beaver in Saskatchewan, the next would find him steering a hot-air balloon over icebergs in Antarctica. He was becoming more and more like his father, racing for airports in New York and Paris, fixed permanently to a jet plane schedule.

He clung tenaciously to his enlarging vision of freedom and responsibility. These two elements struggled within him as they do in an adventurer who has gathered a family. And now he was the father of Alexandra, a flaxen-haired princess who had won his heart.

He had more deeds to perform, so he became a kind of snow bird, always in flight, always returning to the nest. For him, it was an endless round: more films to be constructed, more decisions to be made, more meetings to be attended, more interviews to be answered, more arguments to be made on behalf of the sea.

Some of the things Philippe felt most deeply were expressed in the television series, *Oasis in Space*. By now he had firmly taken the global view of things: everything connected to everything else, all of us together on a single, water-blessed planet. He was becoming an artist, a thinker, a stretcher of ideas, and deep inside was the awesome possibility that he might have a rendezvous with greatness.

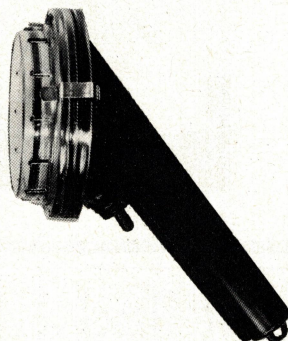
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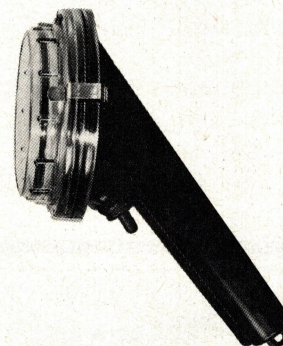
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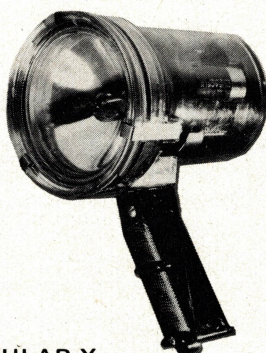
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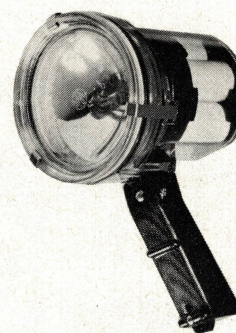
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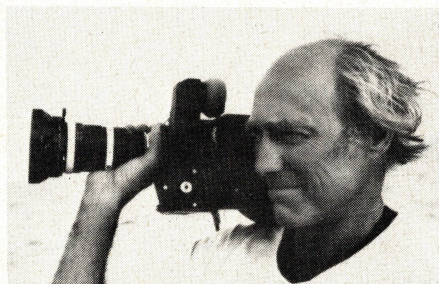

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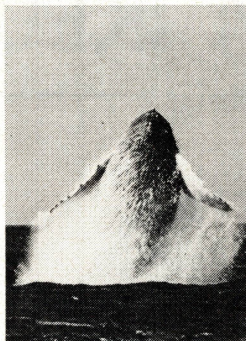


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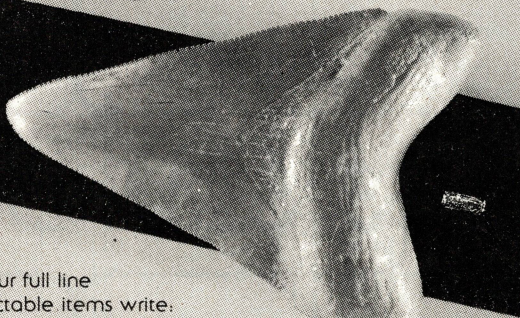
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PHILIPPE COUSTEAU

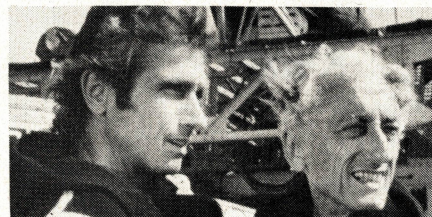
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Then came the accident.

The gyrocopter fell with shocking swiftness, losing power and throwing itself into the rock-hard edge of the island. He barely survived. His right leg was broken, his kneecap shattered into a dozen fragments.

By the time they rescued him, and flew him from Easter Island to California, the pain reached enormous proportions and the leg was infected.

When I saw him in Monaco in the Spring of 1977, his recovery was far from complete. He was as thin as a marlin-pike, walking with a cane, obviously suffering.



When he spoke, there was added softness in his low, resonant voice. "It happened," he said, "but oh, what the hell..." and his words trailed off.

He was determined to overcome his disability. It was a competition with himself in which he set out to conquer the growing threat that he might not be able to dive or fly his plane. The only way off the battlefield lay through endless months of examinations, operations, and physiotherapy. He was 37 years old. It would not be easy.

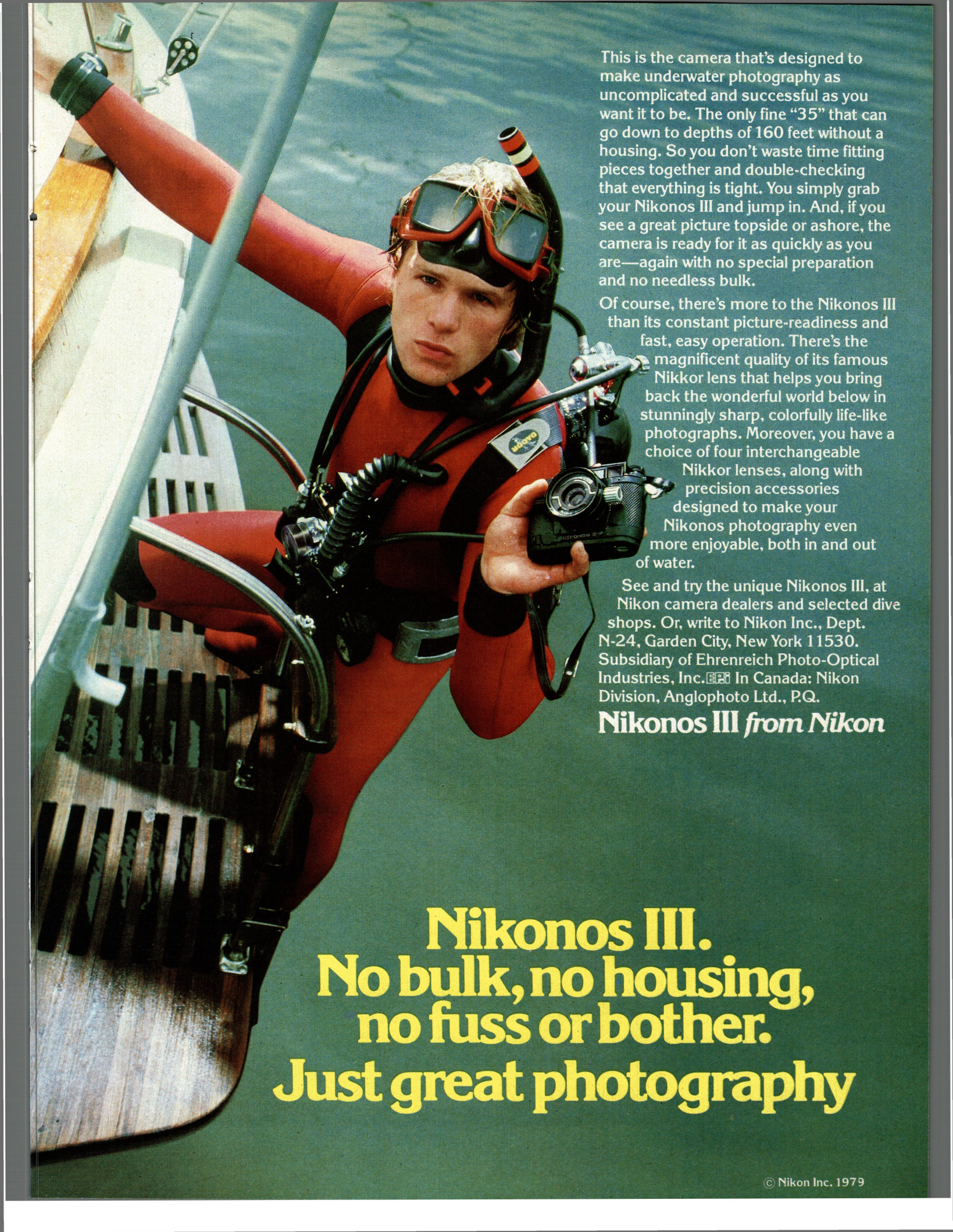
I had driven down from Cambridge with my family, and he and Jan invited us to stay with them in their Monaco apartment. For five days, I watched him get up early to go to the hospital in Nice for his daily "routine." Each morning before breakfast, he disappeared out the door to that silent inner place where thin muscles fight pulleys and weights, where tight ligaments struggle against pain, where drops of sweat grow like storm clouds on the forehead.

He would return around noon looking pale and worn. "It's a replay of the Spanish Inquisition," he said one day. "The only time I feel comfortable is when they throw me into the pool at the end of the session."

I asked him gently if he thought he might regain the use of his leg. "Dammit, yes," he whispered. "I'll win this round — and be flying and diving again — no matter how long it takes."

He paused and a shaft of Mediterranean sun fell across his angular face. "I may not be as good as I once was — but you and I are getting older. We shouldn't expect to perform like teenagers."

(Continued on Page 48)

A full-page photograph of a male diver in a red wetsuit and mask, holding a Nikonos III camera. He is standing on a wooden pier or boat deck, with his right arm raised. The background is a clear blue sky.

This is the camera that's designed to make underwater photography as uncomplicated and successful as you want it to be. The only fine "35" that can go down to depths of 160 feet without a housing. So you don't waste time fitting pieces together and double-checking that everything is tight. You simply grab your Nikonos III and jump in. And, if you see a great picture topside or ashore, the camera is ready for it as quickly as you are—again with no special preparation and no needless bulk.

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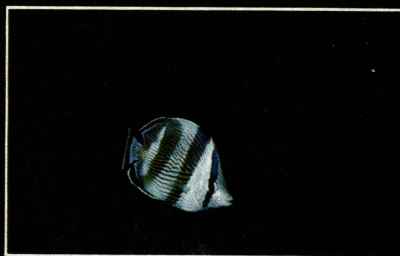
Learning how to duplicate your slides can add new dimensions to your U/W photography. Not only can you improve many of your pictures with duplicating techniques, but you can use these as the basis for creating special effects to brighten your slide shows. And most important, you will have duplicates to absorb the wear and tear of projection.

SLIDE COPIERS

If you already own a quality 35mm SLR camera, a slide copying attachment is probably available from the camera manufacturer. And if not, other companies (such as Vivitar) can supply copiers for almost any 35mm SLR camera. For professional work, some copiers (such as the Bowers Illumitran III) feature built-in light sources, exposure metering and con-



Create unusual effects by making a slide sandwich: Place two slides, one over the other, in a single slide mount and project them together.



trast control. Whichever system you choose — a relatively simple one provided by the camera manufacturer, or a more complex, professional unit—you can do all of the duplicating procedures discussed in this article.

SLIDE DUPLICATING FILM

Kodak Slide Duplicating Film 5071 is packaged in 36 exposure cassettes for 35mm cameras, and is also available in long rolls of 35mm width. This special, low-contrast film is designed to compensate for the increase in contrast which usually occurs when slides are copied on regular color slide films. It can be processed by Kodak, or you can process it at home with regular E-6 chemicals.

IMPROVE YOUR U/W SLIDES WITH creative slide duplicating techniques

By Jim and Cathy Church

FILTER PACKS

The instruction sheet packaged with the film recommends packs made up of various combinations of filters. For duplicating Kodachrome or E-6 Ektachrome slides with an electronic flash, for example, Kodak recommends Wratten filter No. 2B + CC110Y + CC20R. And for a tungsten (lamp) light source, Kodak recommends Wratten Filter No. 2B + CC35Y + CC35C. Please note that these recommendations are starting points only! You will have to experiment with different filters to find the combination which works best for your U/W slides. It is more convenient, and less expensive, to purchase a full set of color printing filters than to purchase individually wrapped gel filters. Just remember to place the color printing filters between the slide being duplicated and the light source, and not between the slide and the camera lens.

LIGHT SOURCES

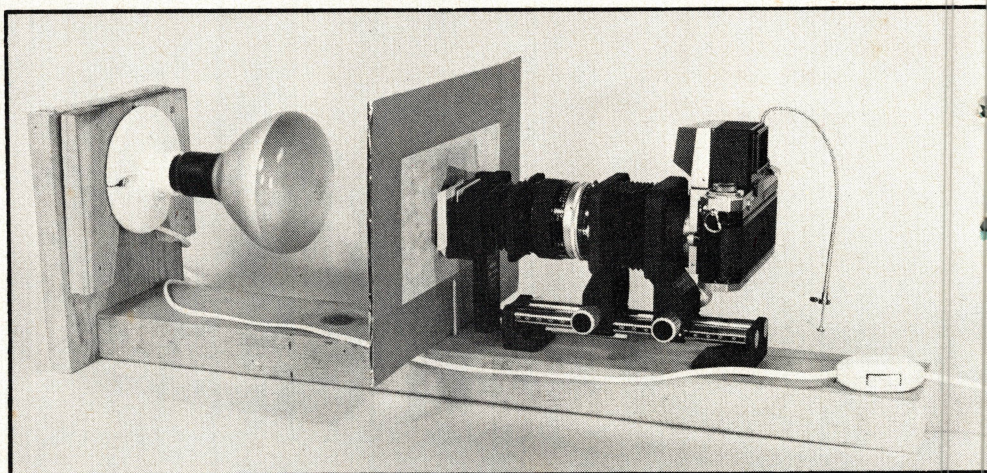
Sunlight, photo lamps and strobes can all be used as light sources for slide copying. For a sunlight exposure, you can aim the camera and slide copier at a piece of white paper which is illuminated by direct sunlight. While this is an inexpensive light source, you are somewhat dependent on the weather and it is usually more convenient to work indoors.

You can aim the copier at a standard movie bulb (500W, 3200K) to provide light for both focusing and exposing the film. A cardboard barrier placed between the light and copier can be used as a heat shield. Cover the cardboard on the lamp side with aluminum foil to reflect the heat away from the copier, and set up a fan if you will be using the system for prolonged periods. Aim the slide copier at the light through a two-inch square hole cut into the barrier. The advantages of this system are that you have a bright light source for SLR focusing, and that you can do some dodging during the long (about one second) exposure time. The disadvantages are that the color temperature of the bulb will slowly change with age and that the end of the slide copier and your original slide can overheat during prolonged use.

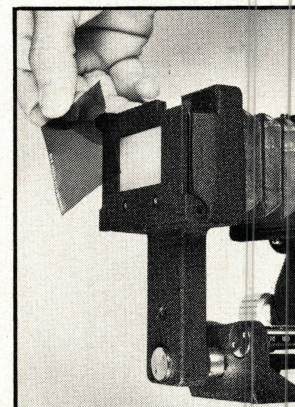
A strobe aimed at the slide copier is a popular light source, but you will still need a bright light source for focusing. Some of the professional slide copying systems have built-in lamps for focusing and strobes for exposing the film. While strobes don't generate the heat problems that lamps do, the power output of the strobe can vary with the recycle time between flashes.

THE BASIC EXPOSURE

Select a well-exposed slide with



A typical home slide duplicating setup (above) includes: Nikon camera with bellows attachment, 55mm Micro Nikkor lens and slide-copying attachment. Professional quality slide copiers such as the Bowens Illumitran (right) have built-in focusing lamps, strobes, and exposure metering systems. Dodging with a neutral density filter (far right) is a way to darken one side of the duplicate slide.



photographs by Jim & Cathy Church

good color and contrast and use this one slide as the standard for all of your exposure and filter tests. You will have to shoot one or more test rolls to calibrate your system for optimum exposure and filtration. Bracket exposures at half-stop intervals with each filter pack. Your goal is to end up with a basic exposure setting, and filter pack, which will produce a duplicate which is close to the original test slide in exposure and color balance. The duplicate, however, will never match the original perfectly.

Once you have established your basic exposure setting, use this same exposure whenever you want your duplicate slide to have the same density as its original. Don't change the exposure setting unless you want the duplicate to be lighter or darker. If you add a filter, open the aperture to bring the needle of a built-in exposure meter back to the "basic exposure" position if you are exposing with a lamp. If you are using a strobe or don't have a metering system, adjust the aperture in accordance to the filter factor.

Each time you set up your system and duplicate a new batch of slides, duplicate your test slide again. This is your control. If some conditions have changed — you're using slide duplicating film with a

different emulsion number, a flood light is aging, or you are doing something different in your home processing — you will see a difference in the test slide.

IMPROVING YOUR SLIDES

Duplicates are often better than originals for projection because you have a chance to correct some of your mistakes. While the duplicate will never be as sharp as the original, you can change exposure, add color, crop, change contrast and sometimes dodge out overexposed areas.

An underexposed slide can be duplicated one or two stops lighter, providing that there are no bright areas where important details will wash out with increased exposure. A slide that is slightly overexposed can be darkened, but you can't restore washed out details or color in grossly overexposed slides.

Filters can be used to change the color cast of a slide. For example, you may wish to redden bluish skin tones in your diver pictures. Increase exposure in accordance with the factor of the filter used. However, if you use a reddish filter to redden the skin tones, this filter will also affect the entire slide. Blue water backgrounds, for example, would shift toward purple.

Cropping (duplicating only part of the original slide) allows you to enlarge a main subject or eliminate unwanted subject areas. The smaller the area of the original slide you crop from, however, the greater the loss of sharpness in the duplicate. Some slide copiers only allow you to crop to the center, others allow you to move the original slide up and down.

Contrast can be increased by duplicating the original on regular daylight color slide film (such as Ektachrome 64 or Kodachrome 64), but you will have to run tests to work out the best exposure and filter pack. Contrast can be reduced by preflashing the duplicating film to lower its maximum density and contrast in the shadow areas. Without placing the original slide in the copier, but with the basic filter pack in place, expose (preflash) the duplicating film with about seven stops less exposure than you will for the copying exposure. While this reduction in exposure can be done by changing the exposure controls on the camera, simply holding a seven-stop neutral density filter pack between the copier and light source is much easier. After the preflash, place the original slide in the copier, set the camera for a double exposure over the film, and expose for the duplicate with

in your duplicate slide as follows: Cover the area with the particles with a piece of neutral density filter during the exposure. Hold the filter just behind the frosted glass plate of the copier and move it back and forth so the edge won't appear sharply in the picture.

Dodging is more difficult if you are using a strobe for the light source. If the copier is attached to the camera with a bellows, hold the filter about one-half inch behind the frosted glass plate. If the camera is on a stand and is aimed down at the slide to be copied, hold the filter about halfway between the camera lens and the slide.

MAKE A SANDWICH

Have you ever waited for a diver to swim through a tunnel, archway or kelp forest so you could get the picture you wanted — and waited, and waited, and finally shot the picture without the diver? If so, don't despair: You may be able to put the diver exactly where you want him with a slide sandwich — two slides, one placed over the other, in a single mount.

Begin by gathering all of your simple, half-empty slides. Look for slides which have both a strong subject and a light, overexposed area. Lay the slides on

mounts and clean them if necessary — remember that you now have four surfaces to collect dust and fingerprints. Place the pairs of slides in single mounts and shoot duplicates. You will probably need more exposure than you normally use to duplicate single slides. However, don't open the aperture wider than about f8 because you need enough depth of field to focus on both emulsion layers and the wider apertures don't produce images as sharply as the smaller apertures. If a strobe is the light source, move it in closer or multiple expose with two or more flashes.

A sandwich slide won't look exactly the same as a regular slide because there will be some overlapping of images. This overlapping can give a "spooky" appearance — and this effect can be enhanced when the slide is included in a slide show with a musical background which sets a spooky or mysterious mood. If the viewer looks at the slide and wonders what makes it seem different, you've been successful.

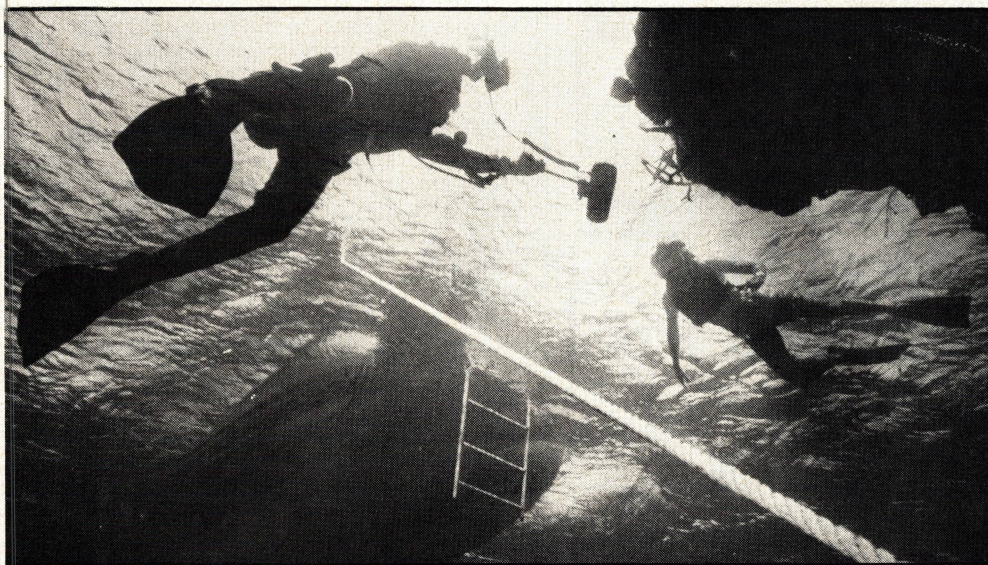
DOUBLE EXPOSURES

You can also combine slides by double exposing the light area of one slide over the dark area of another when you shoot your duplicate.

Begin by looking for slides which have large, dark areas. A close-up of a small fish with a black background, and a diver silhouetted in a tunnel, are two good examples. You can double expose the fish over the dark area of the tunnel shot to show the fish, diver and tunnel all in the same picture. When you stack these slides on the light box, you shouldn't see any light areas. Overlapping light areas can cause overexposure at the point of overlap. Unwanted light areas within a dark area can often be masked out with black paper or tape.

Place the first slide in the copier and make the first exposure. Base your exposure calculation on the bright area only, and note where the dark areas of the slide are in the viewfinder if the slides must be aligned in any particular way. Remove the first slide and place the second in the copier. Double expose the second slide over the first. Expose for the bright area of the second slide. You now have the fish, diver and tunnel all exposed on a single duplicate.

Another double exposure technique is to simply reverse a single slide for the second exposure. Suppose that you have a slide showing a single fish at one side of the picture area, with a black background. By simply reversing the slide in the copier after the first exposure, and double exposing the slide in this reversed position, you now have two fish in your duplicate. Assuming minimal image overlap, expose for the fish.



Here two upward silhouette slides of divers were combined to put both divers in the same picture. Because there is some overlapping of images in sandwiched slides, a spooky result is often achieved. This effect can be enhanced in a slide show with a musical background to set a mysterious mood.

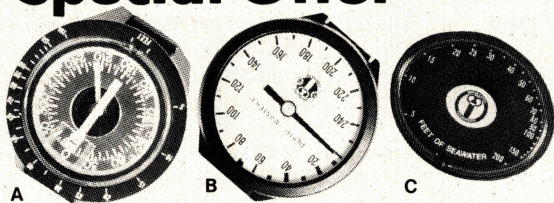
your basic setting.

Dodging overexposed areas is tricky, but can be effective. As an example, suppose that a slide shows backscatter at one side — light spots caused by strobe light reflecting off the particles in the water. If you are using a 3200K bulb as a light source, and a shutter speed of about one second, you can reduce the exposure for the particles

your lightbox and stack pairs of slides, one over the other, so the dark areas of one slide appear over the light areas of the other. By placing a slide of a diver over a slide showing the silhouette of an empty tunnel, you've finally put the diver where you want him. But don't stop here — the possibilities are endless!

Once you've selected the slides for sandwiching, remove them from their

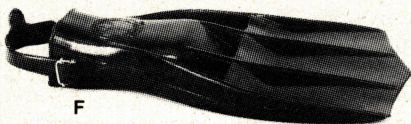
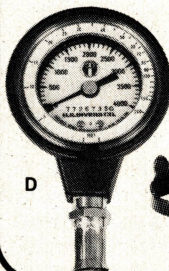
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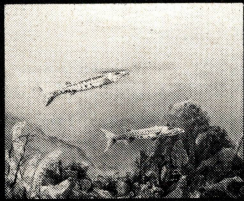
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PHILIPPE COUSTEAU

(Continued from Page 42)

The great bedrock of Philippe's later years was his lovely wife, Jan. She was his insight, the lighthouse that helped him span the thousands of miles he flew and sailed across the ocean landscape. Whenever possible, she traveled with him, keeping watch over the quiet harbors they had established in Los Angeles, Paris and Monaco. An extraordinary woman, she listened, learned and loved him deeply — becoming his inner core, helping send him, like an invisible arrow, toward the right decisions at the right time.

I last saw him in Los Angeles. For different reasons, we had both flown into the city for the day. He asked if I would like to join him for dinner and stay at the apartment. It was one of those evenings when the best wine is decanted into the glass and two friends nudge old memories and new dreamings.

He sat across the restaurant table, the light of a single candle slanting into the features of his face. He was tired, having spent a full day in the offices of The Cousteau Society. We spoke of how the sea had changed our lives, of how it had become a window that allowed humanity's struggles to be seen from a different perspective.

As we spoke, we looked out through the glass and down to the harbor at the scatter of lights coming from the boats. Occasionally he would peer into the darkness for a long time, as if there were a vital message out there for him.

It was never easy knowing the theater of his mind. Over the years, he had gathered countless experiences and thoughts, and stored them behind those deep-set eyes. But he rarely divulged the contents.

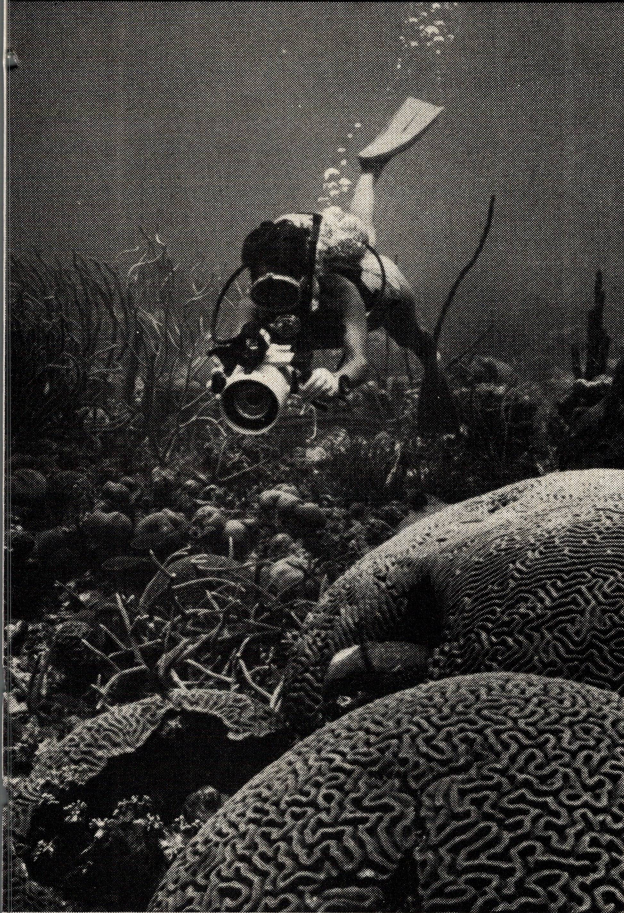
"Eventually, I would like to move away from the ocean," he said, "and make films that grapple with the larger issues. It would be exciting to wrestle with the imponderables of life — love, war, loneliness and death — at least for a while. When I come back to the sea, I would have new strengths, new insights."

This was the measure of the man. Always wanting to try his ship on a greater ocean. He wished to explore the outer islands of his own capabilities, to reach one plateau and go on to the next. For him, the sea was the grand metaphor and within it he hoped to discover the best in himself — and in human relationships. Philippe wanted, despite his shyness, to approach the best system of values, and perhaps discover a new liaison between ourselves and the planet.

And now he is gone... leaving us the legacy of a spirit that graced our lives.

Philippe Cousteau died in a plane crash in Lisbon, Portugal, on June 28, 1979.

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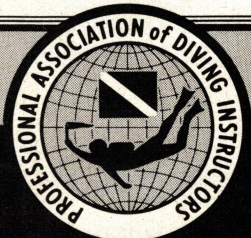
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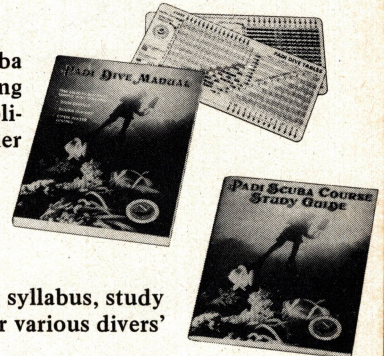
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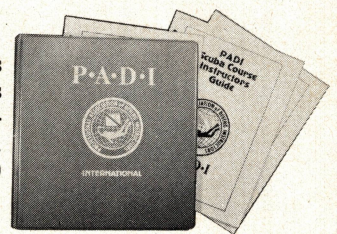
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PADI TODAY'S LEADER IN DIVER EDUCATION

In Search of the Savory Scallop

By Bonnie J. Cardone

As a novice diver eager to enjoy the fruits of the sea, I set out to collect game. And, I immediately discovered that game was not easy to come by. Since I am reasonably intelligent and relatively inept, it soon became obvious that I should concentrate on slow-moving, or stationary, marine life. Into this category fell two potential seafood dinners: abalone and scallops.

I began to find abalone first. It was a while before I could even see scallops. This is because scallops are found among, and masquerade as, rocks. Very often a scallop shell is so encrusted with marine life that it is almost impossible to tell from a rock. In this case the diver must wait and see if it opens. If it is a scallop, it will and the mantle will be exposed. This ranges in color from orange to red and gray-black. Around the fringes are eyes (ocelli). Blue or yellow, these light sensing organs do not actually see images.

Marine life that grows on a scallop shell includes but is not limited to: various algae, hydroids, corynactis and sponges. The encrusted shells are miniature worlds, providing homes for tiny shrimps, crabs, worms, nudibranchs and other creatures.

Very little is known about the particular pelecypod that California divers find all along the coast and around the Channel Islands. It is called the rock, or purple hinged, scallop. The area around the inside of the hinge is purple. The Latin name is *Hinnites giganteus*, Gray 1825. (For a while it was known as *Hinnites multirugosus*.)

The rock scallop is free swimming when young and has a nearly symmetrical shell. While still small, it attaches itself to a fixed object and remains there the rest of its life. If the shell attaches itself to an irregularly shaped object, or if it is in an irregularly shaped space, the shell will become irregular. Sometimes divers will find young scallops growing on top of older or dead scallop shells.

Once you have determined that you have indeed found a scallop, your next problem will be how to remove it. There are two methods. One involves taking the entire shell, the other, only the innards.

A scallop cements itself to its home very securely. If you are going to use the first method of scallop collecting, this cement must be chipped away to release the shell. The tip of a dive knife or abalone iron is useful here. Some serious scallop hunters use a hammer and chisel.

Of course, if you take the entire shell you will have to carry it with you. If the scallops are large or heavily encrusted, a limit of 10 could easily weigh 30 pounds. This is why some divers prefer the second method of scallop harvesting.

This involves removing the innards and leaving the shell intact and in place. This method is preferred by the ecology minded diver because it does not destroy the habitat of many tiny creatures or the creatures themselves. Besides, it saves the game collector a messy cleaning job topside.

To get the insides of the scallop out, insert a thin, sharp knife between the two halves and slice between the muscle and one side of the shell. The shell will open a bit, which allows you to repeat this process on the other side. After you have severed the muscle from both valves, scrape the insides out. Although the entire scallop is edible, you will probably want to discard all but the adductor muscle. This is firm, cream-colored and marshmallow shaped.

Should you choose to bring the entire shell topside, there are several methods for removing the meat. You can use the one described above or smash a hole in the top of the shell with a hammer. Be careful not to cut the scallop in half because it will count as two scallops to Fish and Game officials.

Scallops are delicious raw, cooked, or marinated in lemon juice. Take care not to overcook them. They should be heated just until the meat turns an opaque white. My favorite recipe, from the Santa Monica Blue Fins Galley cookbook, is:

Michelle's Garlic Broiled Scallops

2 lbs. scallops	2 tbsp. chopped parsley
2 cloves garlic, split	½ tsp. dried tarragon
2/3 cup butter	½ tsp. salt
4 tsp. minced onion	dash of pepper

Saute garlic in butter until golden. Remove garlic and add onion, parsley, tarragon, salt and pepper. Wash and drain scallops, cut into bite-sized pieces. Place in a shallow, buttered casserole. Pour garlic butter over top. Broil and stir until scallops are heated through, about four to five minutes. Serves four to six.

In order to collect scallops in California, you must have a valid California fishing license. There is no season and no size limit, but there is a bag limit of ten. A good-sized rock scallop will be about six inches long. The mollusk can grow to be about ten inches long.

Happy hunting, and, good eating! >

photography by Alan M. Heller



By Bill Barada

"I am now, and always have been, opposed to the use of wire fish traps . . . I feel they are the most destructive fishing devices used along Florida's coastline." Major Edward G. Little, Chief, Florida Marine Patrol, Monroe County, Florida.

"In my opinion, fish traps are as deadly to reef fish populations as the use of dynamite." Lyman Rogers, President, Florida League of Anglers.

"Those I represent . . . are unanimous in opposition to fish traps because the devices have the potential to wipe out the resource." Bill Craig, attorney representing both commercial and charter boat skippers.

"Fish traps are the greatest threat to skin diving and recreational fishing the keys have ever faced. They catch everything: parrotfish, squirrelfish, tang, rock beauties, surgeonfish, angelfish and other colorful reef species as well as grouper and snapper. Every fish that enters one of these traps at depths of 60 feet or more is doomed. There is virtually no escape, and when the trap is pulled to the surface and the fish die from embolism due to air bladder expansion." Ed Davidson, owner of the Hurricane Aqua Center in Marathon and vice chairman of the Florida Keys Citizens Coalition, which represents more than 20 separate groups.

"Over 4000 people have signed our petition requesting that the use of fish traps be outlawed in coral reef areas." Alexander Stone, President, Marine Wilderness Society.

The traps referred to here are made of chicken wire wrapped around a metal frame; a cone-shaped opening permits fish to enter but not to escape. Most of the traps use wire with a one inch mesh which is so small that juvenile grouper and snapper, and most marine tropicals, can't squeeze through it. Thus, the baby grouper and snapper, which have never had an opportunity to spawn, are enticed into these devices and killed right along with the adults. This obviously affects reproduction and recruitment of the species and virtually guarantees the decimation of future fish populations.

The traps do not need bait to be effective. A few curious fish will always enter and their struggles to escape attract other fish. As more fish collect inside, the turmoil increases and more and more fish are trapped. Thus, a large-sized trap is a more effective fish-killer than a smaller one, and some traps in use are monsters — 10 feet long, 8 feet wide, and 3 feet deep.

A lost trap continues to attract and kill fish until the wire is eventually corroded away, or until a large predator such as a nurse shark destroys the trap while attacking the helpless victims. In the meantime, many of the trapped fish are horribly mutilated by their frantic efforts to escape, or by attacks from predators such as moray eels, and from cannibalism due to slow starvation.

Evidence of cannibalism is reported by Jerry Pheis, operator of the Majestic Fishing Fleet in Key

photograph by Paul Tzimoulis

FISH TRAPS

Torture Chambers of the Sea





Largo. One of his skippers spotted a lost trap while diving in 90 feet of water. The trap had obviously been down a long time because the mooring line was encrusted with algae. Only two fish were alive inside the trap, a large angel and a snapper, but the trap was half full of fish skeletons piled 16 to 18 inches high.

Cannibalism inside traps is also reported by diver Robert K. Norman who checked out fish traps at depths of 35, 70 and 120 feet, on Pickles and Conch reefs (just south of Pennekamp Park). He reports that each trap had about 30 fish inside; all were tropicals with the exception of one undersized and mutilated grouper. Norman said, "Several of the fish were cannibalized beyond recognition. . . We pulled up two traps from deeper water at a painfully slow pace, nonetheless most of the fish suffered from bulging eyes, swollen intestines, and many had massive hemorrhaging."

Similar horror stories are reported by other keys divers. Bob Brayman of Halls Diving Center in Marathon said the traps are thick seaward of Sombrero Reef and they are, "loaded with fish, about half of which are colorful tropicals." Bob also pulled one very slowly to see if any could be saved. But even those that appeared unharmed flopped around helplessly on the surface after they were released because they were so buoyant they couldn't submerge. Bob said, "It was one of the most pathetic sights I have ever witnessed."

Ditmar Biller of the Diving Site said the traps are "all over the place off Coffin's Patch and Looe Key." He also said about half the fish inside the traps are tropical reef fish such as angels, tangs and parrots; and that many are horribly mutilated with great open wounds on their bodies, missing fins and tails, and bare patches where scales have been rubbed off. Moray eels, rays and small sharks are commonplace inside the traps, according to Ditmar.

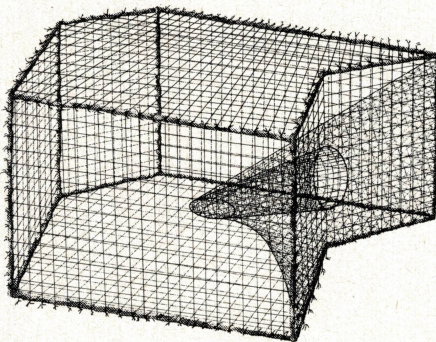
Virtually every diver and dive guide in the Florida Keys can tell similar fish trap horror stories, but the greatest threat to reef fish populations is the deadly, fish killing efficiency of these devices. An example was reported by Captain Tingley of the Florida Marine Patrol in September of 1978, before their use by commercial fishermen became widespread.

Captain Tingley's report states that a single boat, fishing only 10 traps for six days out of Key West, brought in 7000 pounds of grouper. Based on this rate, Captain Tingley estimated that the 14 boats, which were fishing 240 traps in the Key West area at that time, would produce 168,000 pounds of fish per week, or 8,400,000 pounds per year. This exceeds the total commercial landings by all gear types for the entire Florida Keys which is 1.8 million pounds, according to the National Marine Fisheries Service.

The same report stated, "When pulling these traps by winch from 60 to 80 feet of water, most of the fish die because of the rapid ascent. Included in these dead fish are many undersized grouper, angelfish, and many other non-food fish species."

No estimate was made for the total poundage of non-food fish destroyed by the Key West trappers, but Captain Tingley's report contained the ominous warning that, although only a few commercial fishermen were using traps at the time of his investigation, the fish houses stated that 90 percent of the keys fishing fleets would be using traps by 1979.

This prediction was confirmed by a Department of Natural Resources estimate that, as of May 1979, 8000 traps were in use in the Florida Keys alone. The Marine Wilderness Society, based in Miami, made a fish trap survey and came up with an estimate of 12,000 traps in use. The lowest figure quoted for the total number of fish traps in Monroe County (nobody knows for sure) is 6000, and that estimate was made by a commercial



fishing organization.

Regardless of the total trap figure used, 6000 or 12,000, it is obvious that Florida's reef fish populations cannot stand this kind of pressure. The yearly catches of both snapper and grouper were on the decline before fish traps became popular. This is true not only in the keys, but in the entire Gulf of Mexico. The Maximum Sustainable Yield for both snapper and grouper in the gulf has been established at 39 million pounds per year, and this total is already being taken by hook and line. A total of only 6000 fish traps catching a conservative average of 100 pounds per day, just 200 days per year, will take 140 million pounds of fish per year — more than three times the Maximum Sustainable Yield for the Federal Fishery Conservation Zone in the Gulf of Mexico, which extends from Florida to Texas and offshore to 200 miles. Statistics from the National Marine Fisheries Service show there was a dramatic drop in the harvest of both grouper and snapper in 1978 (without fish traps).

Captain Tingley's fish trap report set off an alarm that spread rapidly throughout Florida. As a result, sportfishing organizations, charter boat skippers, dive guides and conservation groups bombarded the state legislature with requests to outlaw the use of fish traps in waters under the state's jurisdiction.

The 6000 member Florida League of Anglers, under the leadership of Lyman Rogers, kicked off a statewide campaign as early as September 19, 1978, with a news bulletin entitled, "Fish Traps Must Go." It contained facts and figures on the deadly effects of these devices.

The Marine Wilderness Society obtained more than 4000 signatures on a petition opposing the use of fish traps on or near any coral reef community. The Society also requested strict regulations limiting the number in use, requiring large-size wire mesh openings, and a biodegradable panel to permit fish to escape from lost traps. The Society also requested a minimum depth limit of 200 feet that would protect deep water corals and effectively ban the use of traps in state controlled waters.

The 40,000 member Florida Audubon Society, The Florida Keys Citizens Coalition, The Florida Wildlife Federation, numerous other conservation organizations, a host of charter boat skippers, and even commercial fishermen all sent representatives to the state capitol to testify in favor of legislation banning the use of fish traps in Florida waters.

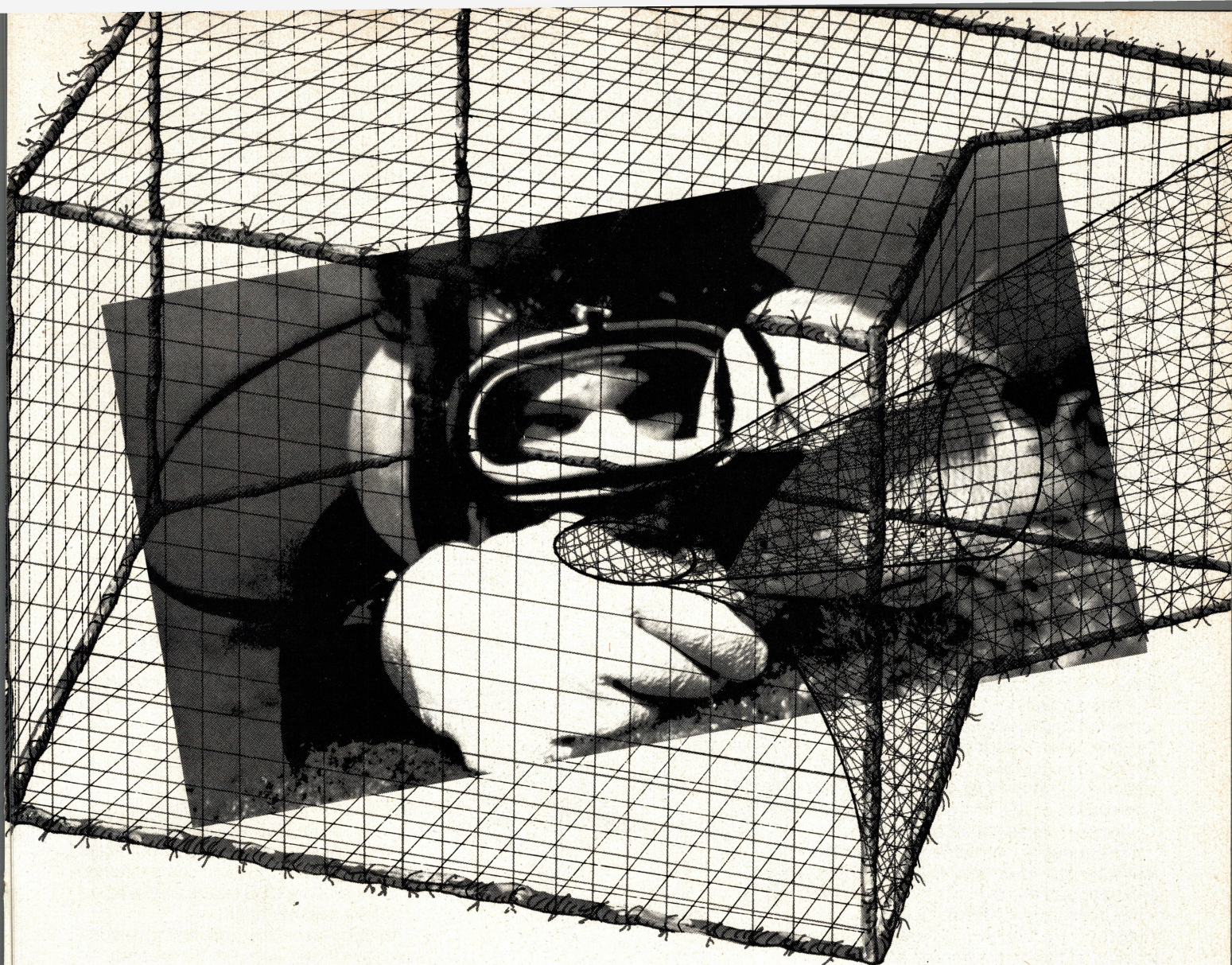
Even state agencies such as the Department of Natural Resources circulated news releases stating their opposition to the use of fish traps and promising to push for legislation making them illegal in Florida.

Only a handful of opportunistic commercial fishermen spoke in favor of fish traps, at least in public. And their opinions were obviously influenced by the fact that these traps are cheap, easy to build, and require very little skill or knowledge to operate them successfully. By contrast, commercial fishing by rod and reel requires considerable knowledge, experience and skill if one hopes to be successful.

Amazingly, despite the almost unanimous opposition to these fish-killing devices — *no fish trap law of any kind was passed by the Florida legislature.*

A number of reasons for this incredible lack of action have been suggested — such as the fact that a total of nine separate fish trap bills were introduced, all different, which confused the issue and scattered the efforts of trap opponents. One suspects, however, that the real reason is that commercial fishing interests used their political clout in backstage maneuvering to influence key legislators.

According to Lyman Rogers, who recorded the proceedings, some revealing statements were made by legislative



members of the House Natural Resources Sub-Committee (which held public hearings on fish traps). Representative Franklin B. Mann, committee chairman, testified to his own committee, "I think it is incumbent on the legislature to look extremely closely at any bill that puts any legitimate enterprise out of business." Chairman Mann did not explain how banning a newly introduced device could put legitimate commercial fishermen out of business.

When Captain David W. Paranchy of the League of Anglers presented a suitcase containing 2000 letters from individuals requesting that fish traps be outlawed, according to Lyman Rogers, the evidence met with snide remarks and annoyance from some committee members, including the chairman. The words of Representative Sam Mitchell illustrate their reaction. He said, "I resent all of these letters as pressure on me."

Rogers reports that spokespersons for sportfishing and conservation organizations were outraged by subcommittee

tactics which muzzled, or sidetracked, testimony favoring a bill to ban fish traps. This was true not only for citizen groups, but also for Representatives Everett Kelly and Tom Gustafson who sponsored a bill to ban fish traps.

So much for political democracy in Florida. Such callous disregard for the public interest illustrates why the entire political process has come into public contempt.

This kind of shortsightedness can have a devastating impact on Florida's tourist-oriented economy. Since fish traps have the potential to decimate fish populations, they also have the potential of drying up the income generated by sport-fishing tourists and, according to Department of Commerce figures, at least 10 percent of the 30 million people who visit Florida each year come for fishing.

According to a Florida State University study, saltwater sport fishermen spent a whopping \$851 million to go ocean fishing off Florida in 1975, and more fishermen are spending more dollars on this

sport in 1979. If only half of this is money spent by tourist fishermen, the state's economy was enriched by more than \$400 million in 1975 dollars — which probably translates into around \$600 to \$700 million at 1979's inflated prices.

Tourist skin divers also have a significant impact on the economy of the Florida Keys. At least half, or 100,000, of the 250,000 divers who visit Florida head for the keys. They stay an average of four days and spend around \$50 per day, which equals \$20 million per year in diver tourism to the keys alone. And this is during the slack summer season.

The 1975 *retail* value of the commercial fish was only \$160 million for the entire state.

Ironically, fish traps have always been banned in Monroe County, Florida. But the Supreme Court ruling in 1975 placed the boundary of the state's territorial waters as three miles from the water's edge, instead of three miles seaward of the reef line. This ruling gave the federal government authority to regulate fishing, skin

diving, coral collecting, lobster hunting, shell collecting and virtually every other water-related activity on Florida's coral reefs and beyond. Florida lost jurisdiction over approximately 4000 square miles of ocean. The lack of federal regulations created a vacuum, and the bandits quickly moved in.

The U.S. Congress attempted to correct this situation with the passage of the Fishery Conservation and Management Act of 1976, the purpose of which is, "... to provide for the protection, conservation, and enhancement of the fishery resources of the United States."

The Act established eight regional Fishery Management Councils which are mandated by the law to develop conservation and management plans and regulations which "must be consistent with the national standards for fishery conservation and management" established by the House and Senate. The Act places "particular importance" on the first standard, which declares, "That conservation and management measures shall be designed, implemented, and enforced to *prevent overfishing while achieving, on a continuing basis, the optimum yield for each fishery.*"

It should be noted that fishery conservation is heavily emphasized in the title of the law, and throughout the wording of the Act. The law gives clear and specific directions that the first, and primary, responsibility of the Fishery Management Councils is *conservation* of the resource.

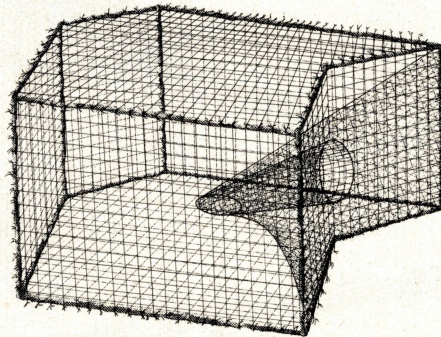
Unfortunately, implementation of the Act was placed under the jurisdiction of U.S. Department of Commerce, and the appointed membership in the Fishery Management Councils is heavily loaded in favor of the commercial fishing industries. Only 13 or 14 people represent recreational fishing on all 8 councils, as compared to 37 to 38 spokesmen for commercial interests. Only 2 of the 17 member Gulf of Mexico Council represent recreational fishing; council decisions are by majority vote. As a result, federal fishery management has degenerated into a battle between commercial and recreational fishing — with sportsmen consistently coming out on the short end of the stick.

The Regional Councils regulate all types of marine fishing in the Federal Fishery Conservation Zone, which includes the entire outer continental shelf to the 200 mile limit. Included in these regulations are restrictions and requirements for taking any type of marine life, including lobsters, clams, seashells, marine tropicals, coral, kelp and other fishery resources — and the Councils can specify the amount and type of equipment used by skin divers and recreational fishermen as well as commercial fishermen.

Most skin divers and sport fishermen support the concept of the Fishery Con-

servation and Management Act as it is spelled out in the wording of the law. However, its implementation has turned into a nightmare that will bring disaster, not only to recreational interests, but to most marine life. The law's mandate for resource conservation is being so blatantly ignored that a more appropriate name for the Fishery Management Councils would be "Fishery Exploitation Councils." The fish trap regulations established by the Gulf of Mexico Fishery "Exploitation" Council is an example.

The Gulf Council announced its proposed management plan for reef fishes (snapper, grouper, tilefish, amberjack and gray triggerfish) in May, 1978. Both the Maximum Sustainable Yield (MSY) and the Optimum Yield (OY) for the total catch of all reef fishes was set at 39 million pounds per year for the entire gulf. The anticipated domestic harvest (no fish traps in use) was 38.5 million pounds. This does not include the tons of non-food fish (marine tropicals) that will be killed by fish traps.



The proposed fish trap regulations were: Minimum mesh size of 1 inch by 2 inches (just right for trapping juveniles and tropicals), a maximum trap size of 54 cubic feet (larger than the average in use), and a maximum of 200 traps per boat with no limit on the number of boats. The only concession to conservation was a requirement for a degradable panel or access door to permit fish to escape from lost traps. No time period for the panel to degrade was set, however, so even this token is meaningless.

The Florida public hearings on the proposed regulations were jammed with outraged sport fishermen and skin divers who pointed out that, since traps were a newly introduced device in U.S. waters, outlawing their use would put nobody out of work.

The Marine Wilderness Society and some scientists concentrated their opposition to a request for changes in regulations such as limiting the total number of traps to be used, increasing the wire mesh size to 2 inches, and requiring a minimum depth for deployment off Flor-

ida of 200 feet in order to protect newly discovered deep water coral reefs.

The vast majority of opponents, however, requested a total ban on the use or possession of fish traps. A powerful argument in favor of such a total ban is that fish trap regulations and specifications, even if effective, cannot be enforced. This is supported by documented evidence that fish traps are appearing in alarming numbers in Pennekamp Park where their use is outlawed. The park superintendent reported that more than 150 have already been pulled and more are being found every week.

Other evidence cited in support of an outright ban was taken from the Environmental Impact Statement prepared for the Gulf Council by the University of Florida, plus a review of scientific studies of trap effects on reef fish populations prepared by marine biologist Albia Dugger. A few highlights taken from these reports draw a convincing picture as to the devastating effects of fish traps.

Some trap fishermen point out that "non-food" fish are not wasted. They are used as bait to make the traps more efficient. A scientific report states that although baited traps are not presently necessary in Florida, the practice will no doubt increase over a period of time because baited traps are far more efficient than unbaited traps. A few examples are:

Large baited traps of 384 cubic feet, raised and lowered from a Gulf Oil Company platform, landed an average of 1200 pounds of snapper from 140 feet of water twice each day, and some catches produced up to 1000 snapper averaging about six pounds each.

An 80 cubic foot trap, using bloody bait, averaged around 80 pounds of snapper per 10 minute set. This investigator stated it paid off to pull the traps after a short time because of the number of fish escaping through the funnel when it became crowded inside. This loss from escaping fish is being corrected by a number of trappers with an escape-proof device over the funnel opening.

The average catch for baited traps in the gulf is 40 pounds per set and each trap is usually pulled 5 times per day, which means the average catch per trap is around 200 pounds per day. Multiply 200 pounds times 6000 traps working 200 days and you get 320 million pounds of fish per year, eight times the Maximum Sustainable Yield — and this does not include the non-food, tropical species which are also killed.

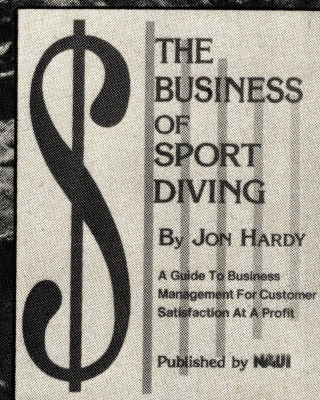
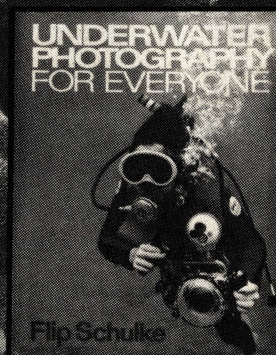
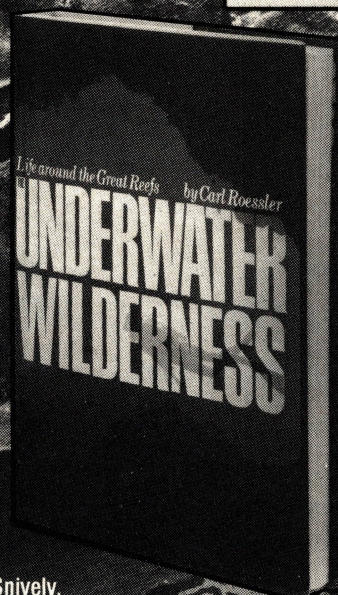
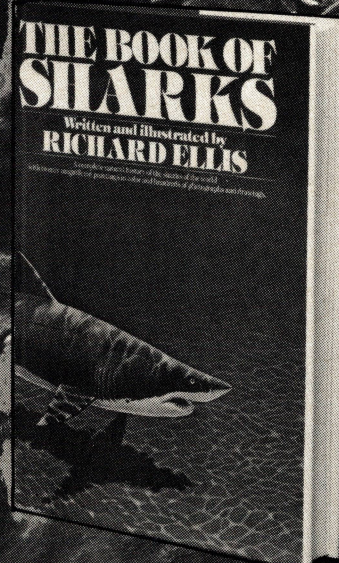
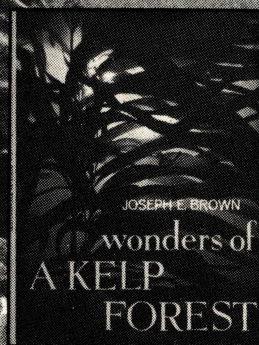
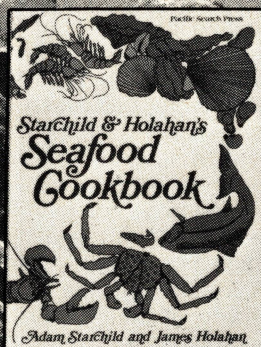
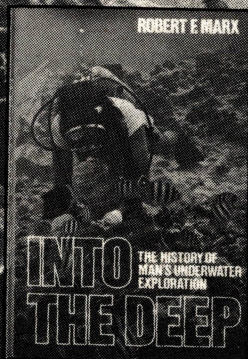
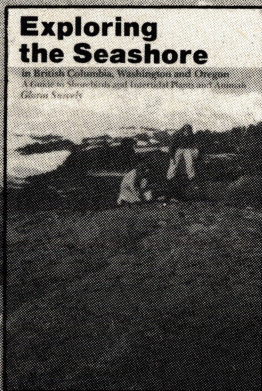
The most alarming reports, however, result from studies of fish traps and fish populations in Caribbean Islands. In virtually every case where traps have been used over a period of years, reef fish populations have dropped dramatically and species distribution has changed quite drastically.

(Continued on Page 67)

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Dependable to begin with, the Sports-ways line of regulators has undergone a major change that incorporates their reputation for solid performance with some new features that extend both their reliability and diving range.

The Arctic 950, introduced in August, replaces the W-600 series as Sports-ways' finest regulator model. In its 12 years of service, the W-600 had become a standard in diving and was copied by at least three other manufacturers. Although imitation is the most sincere form of flattery, it is doubtful that many manufacturers will try to copy the Arctic 950. It is a unique regulator designed for divers who will be diving under unique conditions.

Sportsways has been modifying its second stages over the past 18 months. The exhaust tee has been re-designed

floating piston orifice puts the downstream orifice on a piston that is held against the demand valve seat only when there is air pressure in the second stage hose — no force is exerted after it is removed from your tank, thus reducing wear.

Externally, not many changes have been made to the Arctic 950's second stage. For weight savings, it is injection molded plastic and comes with your choice of black, blue or orange diaphragm covers. The streamlined, flat profile is also pleasing to the eye.

The 950's first stage is massive. You have the feeling that it will handle any extreme the diving environment might offer. Shaped like a heavy chrome cylinder, it attaches to your tank with a 4000 psi yoke and a large, grooved knob. You can easily attach or remove the 950 with

any tank, even if you have to turn it upside down, and still keep your console or pressure gauge on the side you want it. Also included (free of charge) with every 950 regulator is an adapter that will allow you to attach a pressure gauge with the new DEMA high pressure hose thread. During the next year or so most manufacturers will be phasing out the old thread size in favor of one that makes the high pressure and low pressure hose impossible to attach incorrectly. Sportsways realizes this will cause a temporary inconvenience for many consumers and has included an adapter for this reason.

The really intriguing feature of the Arctic 950 is what lies behind the chrome screen. Since the engineers at Sportsways wanted to develop a regulator that could be as at home in Arctic

Sportsways' new regulator has features that extend reliability—and range

By Sharon Saunders

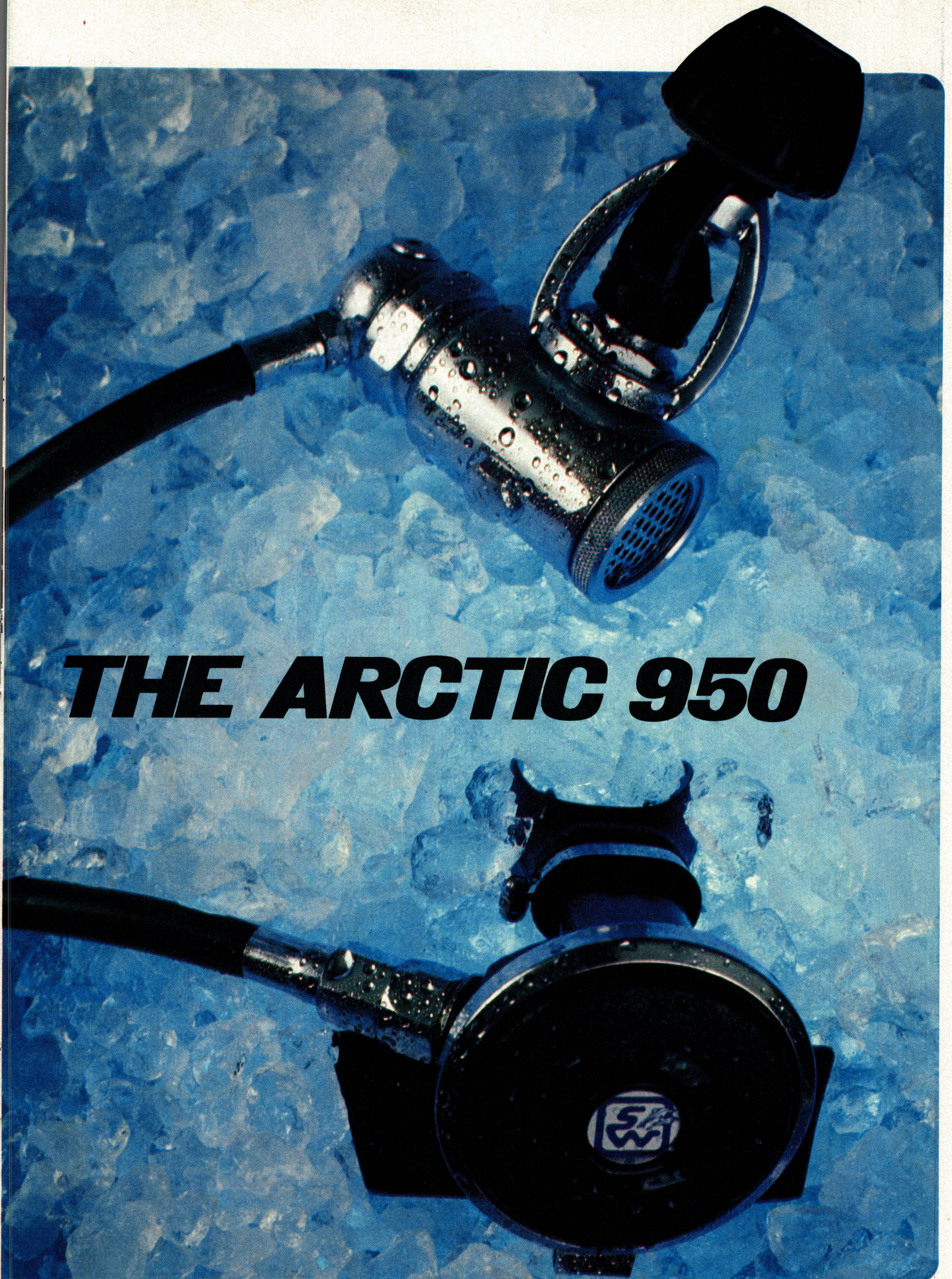
so that exhalation effort is reduced over 25 percent. The "floating piston orifice" was introduced last year, dramatically dropping maintenance requirements. In most regulators, the demand valve rests against a seat when not in use. The spring pressure required to hold the poppet assembly against the orifice seat contributes to several problems — from simple scoring and freeflow problems to de-tuning and loss of performance while the regulator sits on the dealer's shelf. Some manufacturers have attempted stop-gap solutions by inserting a wedge between the diaphragm and its cover during storage, but this is only a temporary solution that requires another piece of equipment to be looked after. The

even the thickest gloves. At the bottom end of the first stage is a three-port swivel for attaching low pressure accessories. The swivel is O-ring sealed with a wiper ring to prevent silt or sand from entering the area and causing wear. The swivel on our test model was a bit stiff, but it loosened up after some use. The stiffness is due to the extra parts put into the swivel to prevent wear, and this initial inconvenience will be balanced by its increased life.

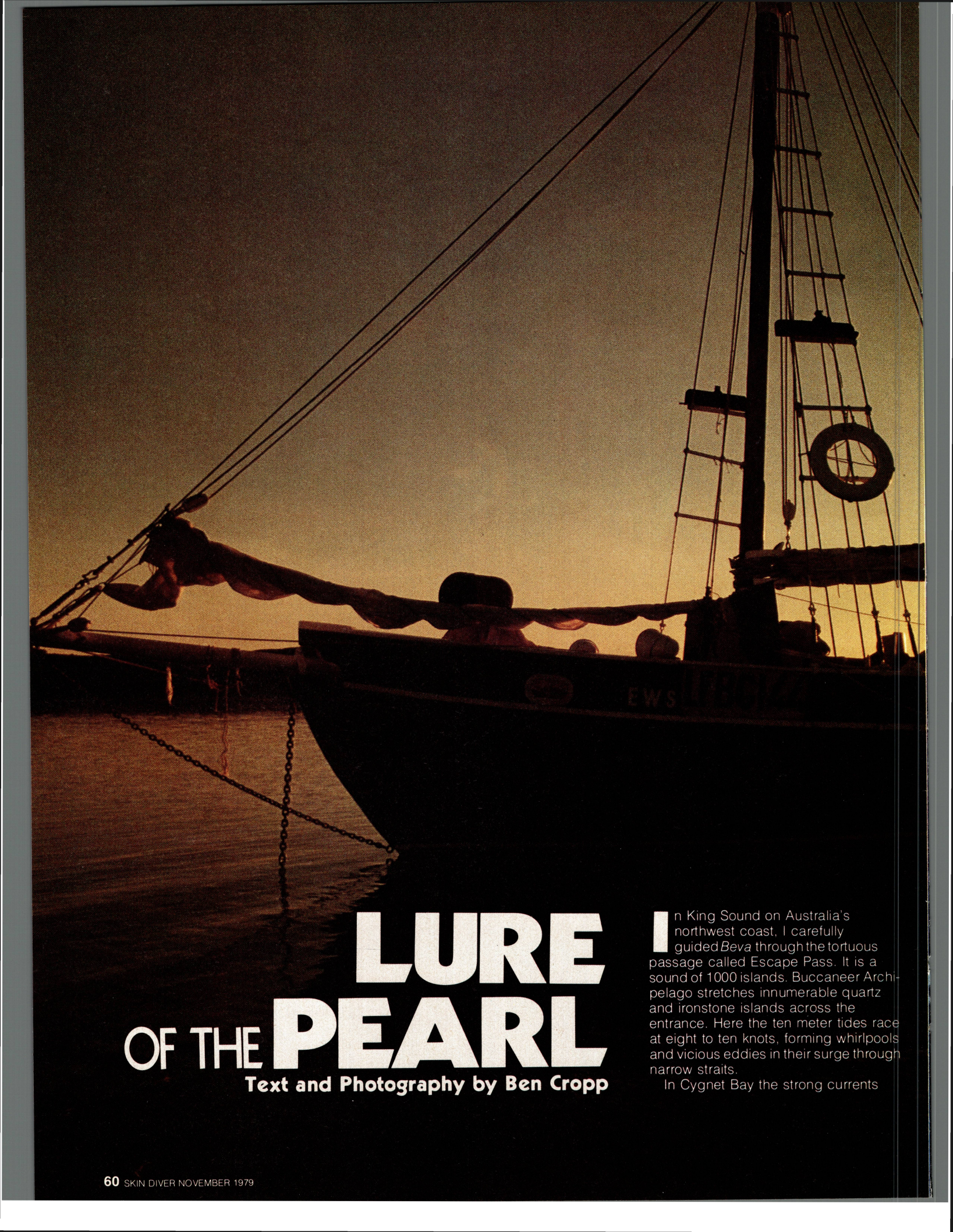
There are two high pressure ports, angled forward on the first stage. This enables you to mount the Arctic 950 on

waters as in La Jolla Cove, they came up with a design that completely seals the first stage components in silicone oil. No water enters the first stage to carry in fine silt or sand. And, because the silicone oil freezes at a much lower temperature than water, first stage freezing has been eliminated. The result is a regulator that balances first stage pressure hydraulically and is equally at home in the silt-laden waters of a Midwest river as it is beneath a Canadian ice floe.

If you are the type of diver who lets your activities take in a wide range of conditions, this may be the regulator for you. At about \$190 in most dive stores, the Arctic 950 is one of the most adaptable bargains available today. »



THE ARCTIC 950

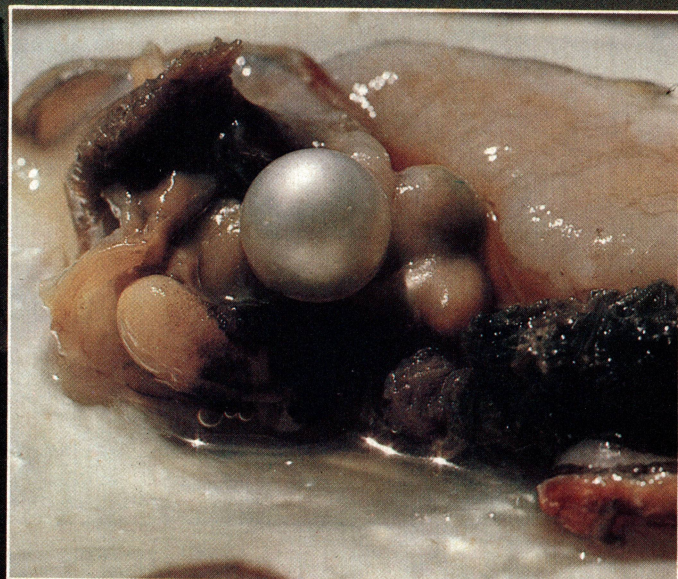
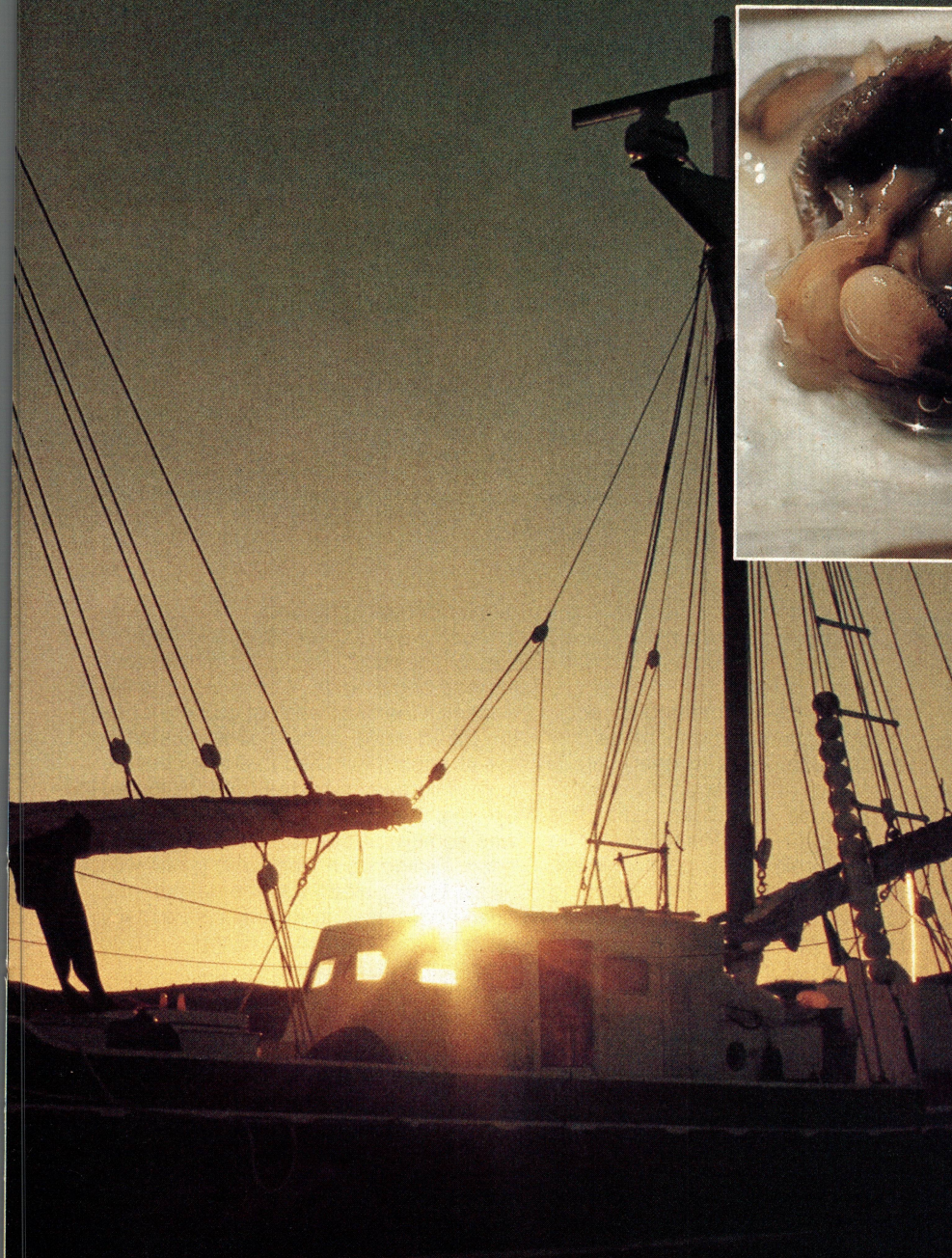


LURE OF THE PEARL

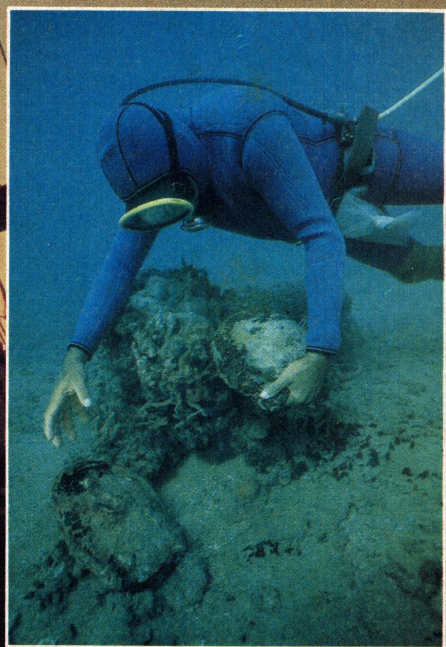
Text and Photography by Ben Cropp

In King Sound on Australia's northwest coast, I carefully guided *Beva* through the tortuous passage called Escape Pass. It is a sound of 1000 islands. Buccaneer Archipelago stretches innumerable quartz and ironstone islands across the entrance. Here the ten meter tides race at eight to ten knots, forming whirlpools and vicious eddies in their surge through narrow straits.

In Cygnet Bay the strong currents



The pearling support ship, or lugger, (left) lies at anchor while a hookah rigged diver (below) picks up two giant pearl shells off Monte Bello Island.



ease. It is a good shelter except during the southeast trades which sweep 50 miles across the sound from Derby causing the waters to heave and boil in all the passages. Descriptive names like Rip Rock, Cascade Bay, Swirl Shoal and Tide Rip Islands are a nightmare for skippers when the king tides run strong against a fresh breeze.

I came into this wild country on the lure of the pearl. The romantic days of the old pearl diver are now over, but here a new

industry has blossomed from the hardships of the old. In Cygnet Bay there now exists a thriving cultured pearl industry. This operation, and the colorful history from which it has bred, was what I wanted to film for my next television special, *Lure of the Pearl*.

Brothers Lyndon and Bruce Brown, who operate Cygnet Bay Pearls, met us at their raft platform nestled inside the sheltered waters of Lugger Cove. On the sand hill close by were quite a number of

graves of old pearl divers. They died of the bends and now only a few rocks and lines of bottles in the sand mark their last tragic dive. Down here on the raft the Browns reap pearls without any of the old dangers.

Lyndon is an expert pearl oyster surgeon. He skillfully seeds each oyster to make a pearl grow. Some 18 years ago his father dropped him off here with a swag and said, "Find me some water and a good spot and we'll start a pearl farm."



OF THE LURE PEARL

In the early days of pearling, luggers were aground at Broome at low tide (left). The life of a pearl diver was difficult. With no knowledge of the bends, death was a constant companion. The author (top right) views the graves of old-time divers. Modern pearl seeding (bottom right) is a delicate operation.

Lyndon's father gave him a lot of time to search — he returned three months later! Obviously Lyndon found water, he had to. From a rough beginning the Brown's intrepid venture grew into a thriving "All Australian" industry.

Lyndon was once a school teacher, then a crocodile hunter, and now a farmer of pearls. From a basket of freshly caught pearl oyster shells already wedged slightly open, he took one shell and explained how the operation is done.

"We clean the edge of the shell a bit so that we can see better. Most of these shells have a little crab inside them. We just move him over as he's in the road. He keeps the shell clean. Then we make an incision in the animal's flesh. I take a little bit of mantle from another pearl shell, clean it up a bit, then it goes into the incision. Now we take up a nucleus, these are of different sizes depending on the size of the oyster shell. The nucleus follows in after that piece of mantle I put in the incision, and now it's finished. Hopefully the small grain will become a big pearl in a couple of years' time.

"It takes a certain amount of skill but we get a lot of practice. I can average 150 operations per day, so with four of us working that's over 500 insertions a day."

Lyndon hopes to seed 30,000 pearl shells this season and put these back into the ocean with the many thousands of others already placed there. It all sounds simple, but the Browns have nearly 18 years of experience of trial and error. Now they are specialists in the delicate operation of giving nature a nudge in forming perfect pearls.

It is the grafted piece of mantle which actually makes the pearl. The graft grows and envelops the pea size nucleus and begins to slowly but surely build up layers of nacre to form the pearl. Just to be sure, Lyndon will X-ray each shell a few months later to see if the nucleus is being

covered over or has been rejected. Pearl oysters do have a little say in the operation and perhaps 15 to 20 percent will reject the foreign object.

In nature, pearls are created by accident. In pearl culture, Lyndon makes that accident happen. Pearl oysters have a rugged exterior and a perfectly smooth interior to house delicate organs. The mantle extracts lime from the water to construct and enlarge the shell. If, in nature, a parasite enters the nacre forming area, the oyster coats this foreign body with the nacre-forming substance. This is the birth of a pearl. The animal keeps adding layers of nacre and so the pearl grows. The natural way is really no different than the trick of inserting an artificial nucleus which becomes the foreign body. The resulting pearl will look the same, but it is much more likely that the artificial variety will be smoother and have a more perfectly spherical shape.

The real advantage of cultured pearls is that almost every oyster produces a pearl. In the old days of pearl shell diving, an average of 50,000 shells had to be collected and opened to find one decent pearl. And, in the old days, death was a constant companion. One hundred forty-five helmeted divers died in the eight years from 1909 to 1917. In one year alone, 34 pearl divers perished. The villain was the dreaded bends. In those days little was known about decompression sickness and nitrogen narcosis, and there were no dive tables or decompression meters.

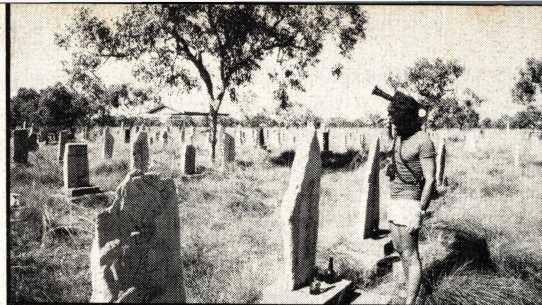
The native divers were superstitious about death, the Japanese were fatalistic. As soon as a horribly paralyzed, gasping diver was hauled on deck, another suited up to take his place. Naturally, the Japanese were the best divers, and Broome cemetery has a special section for all their bodies.

The most horrible of all diving acci-

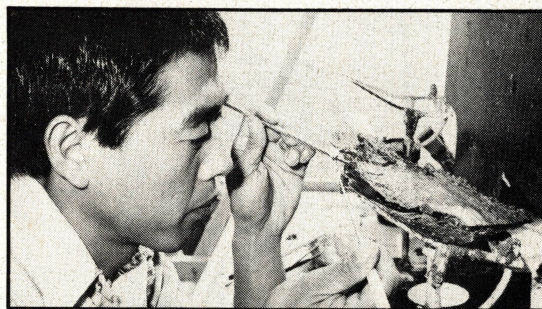
dents occurred only with helmet divers. In murky water a diver could unknowingly step off the edge of a coral crevasse and his lead boots rapidly plummet him to the bottom. If the diver was not quick to close the bleed valve on his helmet to shut in the air, death followed in a most bizarre form. The diver's body would be forced up into the rigid helmet, where space was somewhat cramped already by his head. Pulling up a slack diving suit with all the body pulped into the helmet, had been known to immediately cause many resignations from pearl diving — even among the Japanese.

With all such dangers facing the old-time pearl diver — the bends, narcosis, sharks, helmet squeeze and many others — it was the cyclones which caused the greatest death toll. These "willy-willy," as the locals call them, sweep through the months of January to April with devastating force. In 1876 a cyclone drowned 69 men. Five years later another willy-willy wrecked 12 luggers and drowned most of the crew. As luggers and divers increased after the turn of the century, so did the fatalities from the storms.

The worst cyclone for a Broome fleet happened in 1935 just off the Lacepede Islands where we had been filming a few weeks earlier. The barometer plunged, a warning of impending disaster, but an eerie calm stopped sails from filling to run from the storm. In this glassy sea the pearl divers waited apprehensively, absolutely helpless in the face of certain death. The sky was black, almost like night, not a ripple of wind stirred the deathly calm. Then out of the north came a roar, a terrifying roar and a wild wind. Thirty-two boats heeled over from the force of the blow; masts, sails and rigging crashed onto the decks, then a tidal wave engulfed the ships and crew. One hundred forty pearl divers died that day — only one survived.



photograph by Lynn Patterson



It was not just the lure of pearls that took these divers down into the murky tide-swept depths. The business was mainly pearl shell, the harvest of pearl oysters for a booming button and costume jewelry industry before the advent of plastic. In 1914 Broome divers collected 1000 tons of shells worth half a million dollars in those days. Inside those shells \$168,000 worth of pearls were found.

Finding pearls was a bonus. The most valuable find was a trick in pearly nature called Southern Cross. A huge cluster of baroque pearls had formed inside one oyster and was shaped into an almost perfect cross. This nature-made piece of jewelry was sold for \$20 in 1883 by the finder and \$48,000 when resold in 1924. In those days a top quality 80 to 100 grain pearl brought \$8,000 to \$13,000.

The pearl shell industry crashed in World War I, then took another drastic tumble in the depression years. Plastics then took over, and Broome and pearl diving lay in the doldrums until the cultured pearl resurrected the industry in 1956. Today it is a huge, growing industry.

Today the divers have tossed aside the cumbersome hardhat helmets and use the freedom of modern hookah. They swim, not walk, and drift in a weightless world with an umbilical air hose linking them with the lugger.

Two heavy outriggers spread both hookah lines and divers 14 meters apart. A weighted shot line is suspended from each outrigger boom. To this is secured a large shell bag and a long tow line. Each diver holds this tow line and lets the two knot speed of the lugger sweep him over the bottom.

Skipper Phil Grose had looped another tow line on the shot line for me. With my camera I could now move up and down the line, around and in front of the diver, ready to capture the moment he dipped down and plucked up each shell.

Even though the water was dirty, it was an exhilarating tow being swept, 10 meters down, over pearl shell country. Whispy seafans and colorful gorgonians brushed our bodies as we swept past. Goggle-eyed monkey fish drew oversize jaws into cylindrical sand holes as our shadows passed over.

At the end of the drift, Mick emptied his bag of shells into the larger storage bag. He took his mouthpiece out and gave a burst of air to inflate the parachute bag and surfaced with some 80 shells. Diver Gerrard Kleczewski also popped up with a bagful and perhaps 150 pearl shells tumbled on deck, where they were sorted and marine growth cleaned off. These shells were packed in wire baskets and submerged in a storage tank to keep them alive for the long trip back to Brown's in Cygnet Bay.

Pearl shell collecting is the most strenuous of all commercial diving operations, each diver spending over eight hours every day underwater. The old charm of the hardhat days has gone but there still remains one link. These modern divers still operate from the original luggers whose proud lines still echo Broome's romantic past.

Heavy weather forced me to seek shelter at Lugger Pool deep inside Hermite Island. I took *Beva* up the narrow, tortuous passage which leads to this most sheltered lagoon. A lugger was already anchored there. Old Cec Piesse, retired fisherman and former pearling skipper, welcomed us onboard his lugger *Voltaire*. Cec had a lot to tell us about the old days. Right here, he said, were found the biggest of all pearl shells in the world. They were so huge, a pair were sent for exhibition at the Paris show in the heyday of pearling. Cec showed us one of these shells, some 12 inches across. He found it a few years ago only a few meters from where *Beva* now lay at anchor.

Ron quietly slipped into the water. Half an hour later he surprised us all when he surfaced with two giant pearl shells. The larger one was 12¼ inches long and 13¼ inches wide. Ron was eager to pry them open so I set up the camera to record the opening of the pearl shells.

Inside the first one he found a tiny pearl. Really excited, Ron now pried open the larger shell. Out rolled a couple of little pearls. Hands quickly grabbed them, and fingers explored around all the meat in the shell. Four more pearls were located, one much larger than the others — an unbelievable six small pearls.

Bedlam reigned! Filming was forgotten! Five pairs of flippers rapidly disappeared under *Beva*.

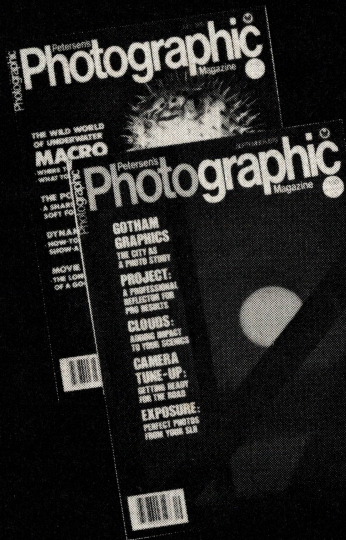
We systematically searched all the lagoon and passages, with one diver in the dinghy doing pick up. Another five more giant shells were onboard *Beva* within the next two hours. Surprisingly, all these were found within 100 meters of the ship.

Wally scored the best with four of the five new clunkers. We gathered round a very confident Wally who already had a dish beside him to hold all the anticipated pearls. There was not a single one in the first he opened. A small pearl came from the second and nothing from the fourth.

What about the third shell? In its mantle folds lay the white luster of a beautiful pearl. It was a magnificent natural pearl, perfectly round. We were told it once took the opening of many thousands of shells to find one pearl. With the giant shells of Monte Bello Island, it was quite a different tale. In seven oversize shells we found a total of nine pearls. That is a fantastic average.

These shells were very old, at least over 50 years. They had survived the atom bomb blast of 1952 and had gone on forming pearls for another quarter century. Perhaps our find will start afresh the romantic lure of the Pearl.

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MEDIFACTS

(Continued from Page 36)

Question: Eddy Ogle of Austin, Texas, is thinking of diving in small lakes, for example to recover golf balls, and asks about the risk of picking up infections.

Answer: One concern is schistosomiasis. Schistosomes are tiny parasitic worms with a fascinating life cycle. They have several larval forms which alternately infect snails (the intermediate host) and then either fish, turtles, birds, or mammals (the definitive host). Remember that we're mammals. Inside the body of the definitive host they mature into adult male and female worms. Naturally these copulate. The fertilized eggs are shed with the host's urine or feces. In water, these eggs hatch into new larvae that set off looking for another snail. Play it again, Sam.

Luckily the kinds of schistosomes we have in the United States can't thrive in humans. But they don't know this. Therefore, they stupidly attack people and burrow into the skin. They die off, but do cause a pesky rash called swimmer's itch. This is especially common on warm, calm days in the Midwest. Ask the locals. Thin wetsuits are protective.

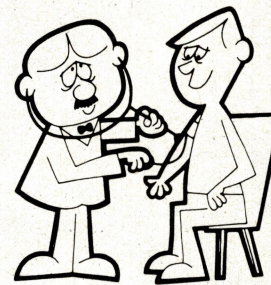
There've been a few cases of meningo-encephalitis (infection of the brain and its coverings) in freshwater divers, caused by an ameba called *Naegleria*. Although rare, it's important to know about because it's almost always fatal. Symptoms begin within a few days — first stuffy nose, headache, and sleepiness, and then fever, vomiting, and various neurological disorders. Usually the cause of death is not discovered before autopsy. So far only one case has been properly diagnosed, treated with drugs that kill amebas, and survived.

Commoner but much less deadly is leptospirosis. You can acquire this in ponds fed by creeks that flow through pastures where infected cattle graze. Or it can be a present from man's best friend — the dog. Symptoms begin a week or two after exposure, and include fever, aches, and jaundice lasting up to several weeks. Local veterinarians will know if there's much danger.

Check also with the local health department. If they've had reports of typhoid or salmonellosis, get vaccinated against these. If there's much hepatitis around, stay out of the water, and if you can't, see a doctor for a gamma globulin shot. Tetanus immunization every five to ten years is routine protection.

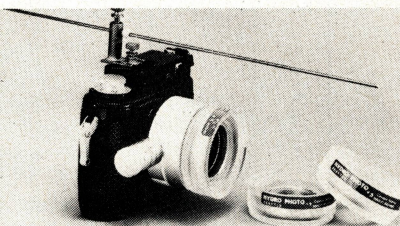
There are other risks. Anyone who gets wet a lot can get otitis externa — swimmer's ear. Colds and pink eye are often picked up in heavily used swimming pools, though rarely from natural waters. Skin abrasions can become slow healing ulcers if infected by certain mycobacte-

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A NASDS Profile: Mike Drakulich

"The Ten Weeks That Changed My Life."

Mike Drakulich fell in love with Jamaica and its underwater world eight years ago. While operating a campground there, he dived but lacked the skills or knowledge to operate a professional sport diving center. Five years ago, he made the best decision of his life. He returned to the States to enroll in the 10-week NASDS Instructional College in San Diego.

After graduation NASDS arranged a position for him at Divers Corner in Downey, California, where he became Educational Director and taught four classes a week. He was dive-master for charter boat dives and beach classes on weekends, sold and repaired equipment and learned the ins and outs of the sport diving industry. Three years ago, he returned to Jamaica.

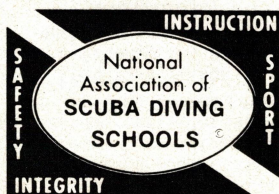
Today Mike directs the popular Jamaica Hilton Aquatic Club and captains his own twin-diesel dive boat, the Jamaican Queen. Every morning divers in Ocho Rios assemble at the Hilton dock as the Jamaican Queen and Boston-whalers loaded with snorkelers and scuba students, guides and instructors head for the reefs and lagoons to learn and explore.

According to Mike, "The NASDS College makes men and women excellent scuba instructors and prepares them for responsible positions in the sport diving industry. Graduates are professionals with lifetime careers in diving. Louie Ritch, my Jamaican dive-master has attended the College, as will all our leading guides in the future. Operations like mine throughout the Caribbean are looking for NASDS College graduates. If you are considering a career in sport diving, there is no better starting point or preparation than those ten intensive weeks of diving and learning in San Diego. It's the only real instructors college in the diving industry. It is the best decision you can make. I know!"

You can call Mike at the Jamaica Hilton, Ocho Rios, Jamaica, 972-2382.

Diving is a career. The sport diving industry is in constant need of qualified instructor/divers, resort and store managers. The NASDS Instructional College provides you with the training and, more importantly, with the credentials to enter the field successfully.

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MEDIFACTS

ria — germs related to those that cause tuberculosis and leprosy. This too is mainly a swimming pool hazard.

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CALIFORNIA FISH AND GAME REMINDERS

The California Dept. of Fish and Game offers these reminders to California sport divers:

1. Copies of the Sport Fishing Regulations may be obtained from: California Dept. of Fish and Game, 1416 9th St., Sacramento, CA 95814.

2. Divers 16 years old and older intending to take game must have a valid California fishing license. These may be purchased at sport landings and most sporting goods stores for \$5.

3. Abalone cannot be taken during darkness: only from one-half hour before sunrise to one-half hour after sunset. Ab irons must be less than 36 inches long, straight, or with a curve of not less than 18 inch radius, a width not less than 3/4 inch and a thickness not less than 1/16 inch. The legal limit of abalone per day per person is four.

4. Lobster are in season from the first Wednesday in October until the first Wednesday after March 15. The limit is 7 per day per person. Lobsters must be 3 1/4 inches long from the rear edge of the eye socket to the rear edge of the body shell. An appropriate measuring device must be used.

5. Halibut must be 22 inches in length. The limit is 5 per person per day. »

U/W ARCHAEOLOGY SOCIETY

The diving community of Nova Scotia has announced the formation of the U/W Archaeology Society of Nova Scotia.

The society works closely with the Maritime Museum and hopes to make a significant contribution to the history of marine Nova Scotia by locating, researching, charting and recovering artifacts from the territorial waters of Nova Scotia.

Membership is open to divers and non-divers who are interested in researching as well as working on an underwater site.

More information can be obtained by contacting the society at 1747 Summer Street, Halifax, N.S. »

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FISH TRAPS

(Continued from Page 56)

An example is Jamaica. The abundance of reef fish is "remarkably low" and scientists attribute this directly to the impact of wire mesh fish traps. The investigators state, "Radical changes in the composition of reef fish communities might result from such a situation."

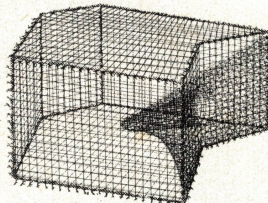
Another example is the Virgin Islands where trap fishing accounts for 80 percent of the grouper catch. Scientists noted a sharp decline in the last two years with a drastic change in the size and age of reef fish communities. They state, "We consider this to be a strong indicator of over fishing with potential disastrous ramifications to the population's reproduction."

Similar effects were reported from other areas in the Caribbean and, as the Florida League of Anglers pointed out, the council's own reports show that only 49 boats fishing 20 traps each have the potential to take more than the Gulf of Mexico's Maximum Sustainable Yield of 39 million pounds per year — and there are already between 6000 and 12,000 traps in use in the Florida Keys alone.

The answer of the Gulf Council to this testimony was, "At this time we do not have enough or sufficient biological information upon which to make our judgement. We have to do it showing that it is detrimental or harmful to the stocks, but it

has never been researched to the quality that is needed . . ." B. J. Putman, Chairman, Reef Fish Committee. He also stated that no new studies are planned by the Council and that it is up to opponents to "prove" that fish traps are "harmful to the resources."

As Dr. Archie Carr, who represented the Florida Audubon Society at the hearings, stated, "It looks like the use of fish traps has already been decided upon by the council members." Dr. Carr also suggested that the council's proposal was "worth going to court over."



The testimony by skin divers, sport fishermen and conservationists may have had some effect on committee members. The final draft of the Council's fish (management?) plan calls for:

Prohibiting fish traps from a "stressed area" defined as inshore from 100 feet of water depth in South Florida. If enforced, this will keep traps off the shallow coral reefs, but the changes made to compensate commercial fishermen for this minor "sacrifice" reveal an exploitation mentality that is truly frightening: 1) The size limit

on traps was removed, 2) the number of traps per boat (formerly 200) is now unlimited, 3) the minimum mesh size (formerly one inch) was deleted.

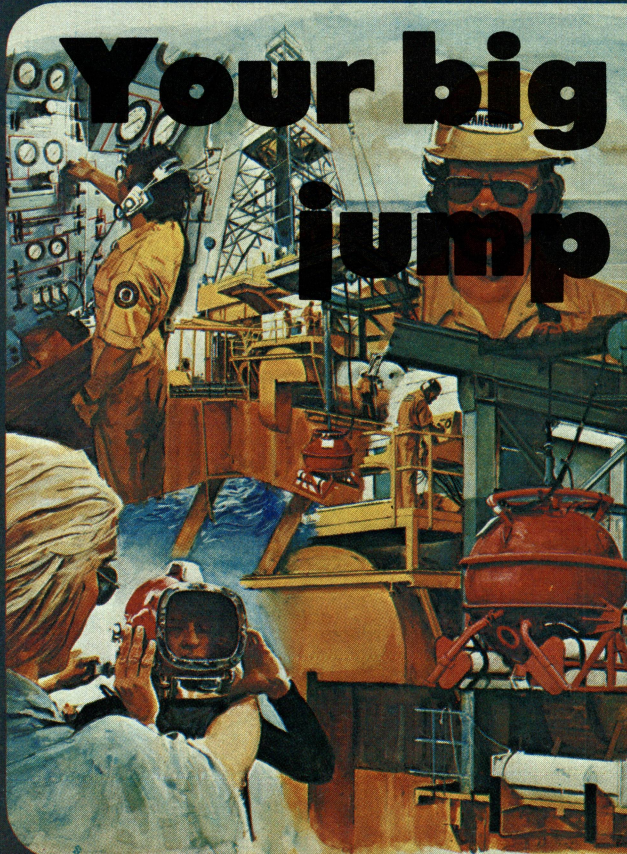
By these changes trappers were given the green light to design and use as many of the largest and most deadly of these fish-killing devices their boats can carry. Baited traps are not mentioned, so the use of tropicals for baiting purposes is permitted.

Included in the plan are regulations to limit the bag limit for recreational fishermen in the "stressed area." Also included is a threat of future regulations restricting the use of scuba for taking reef fish in the "stressed area."

Thus, by ignoring the testimony of marine scientists, recreational fishermen, skin divers, conservationists, and the mandates of the law it is supposed to uphold, the Gulf of Mexico Fishery Management Council has demonstrated that it deserves a title change to "Fishery Exploitation Council." I suggest that letters addressed to politicians refer to the council by its appropriate title.

It appears that the best hope of putting this committee out of business is through legal action in the courts. Outraged skin divers who want to get in on the fight can keep themselves abreast of developments by contacting: The Marine Wilderness Society, P.O. Box 943, Miami, FL 33165, and/or The Florida League of Anglers, Box 1625, Ocala, FL 32670. 

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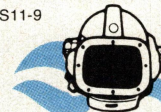
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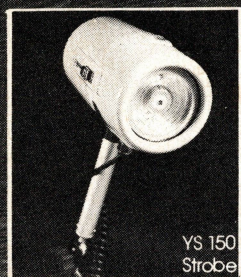
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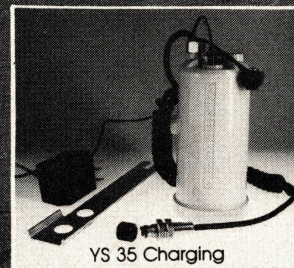
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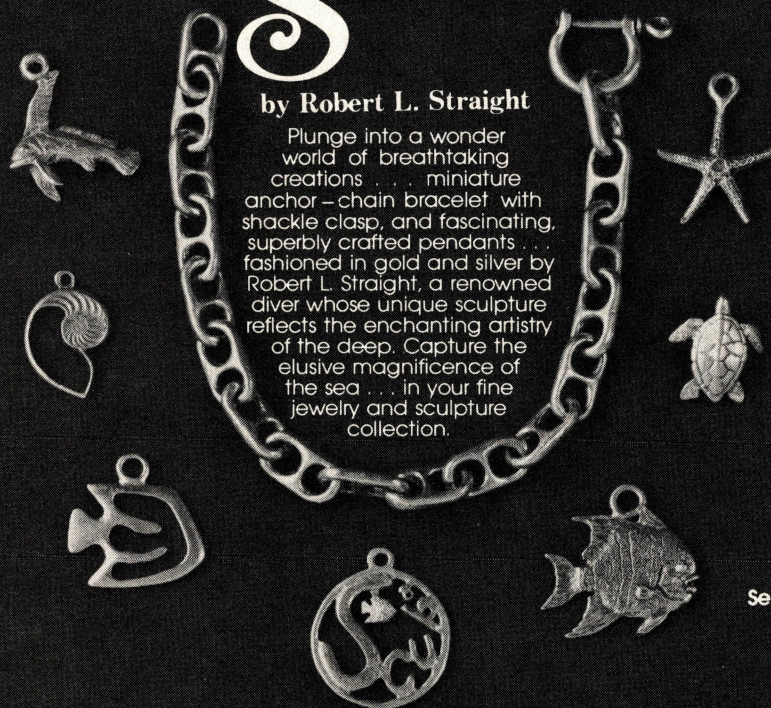
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MARINE SANCTUARY RULES CRITICIZED

New federal regulations for the implementation of the Marine Sanctuaries Program have been proposed by the National Oceanic and Atmospheric Administration (NOAA). However, in formal comments filed in Washington by The Marine Wilderness Society, the new rules have been criticized as too weak and too limited.

The Marine Wilderness Society has officially requested that NOAA's guideline proposals be amended to give highest priority to sanctuary nominations involving the habitats of endangered species, that equal regard be given to potential economic value to be gained by designation of a sanctuary, that recreational and esthetic values be recognized to be primary sanctuary criteria as required by law, and more.

Copies of the complete formal position can be obtained by writing The Marine Wilderness Society, P.O. Box 943, Miami, Florida 33165.

JAPANESE SCUBA TEXT

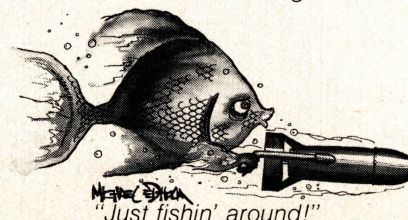
The Professional Association of Diving Instructors (PADI) has had its entire Modular Scuba Course package translated into Japanese. The PADI Dive Manual, along with the Scuba Course Study Guide, quizzes and exams, dive tables and charts have all been translated. This complete instructional support package has been developed with the quality and simplicity comparable to its English equivalent. Durable plastic waterproof tables are provided with each textbook. These tables are in metric form and are comparable to the standard PADI Dive Tables.

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The 4-Reale Piece of Eight (about 7/8" diam.) in bezel frame with 24" sterling chain: \$150. **The 1-Reale Piece of Eight**, about 1/2" on 18" sterling chain: \$75.

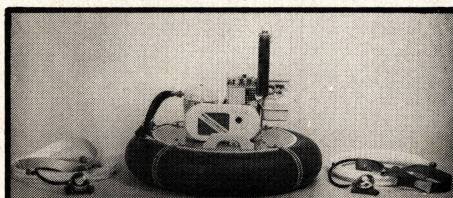
Each comes with Certificate of Authenticity and History, and you must be delighted or return for prompt refund. Sale of these coins authorized by Florida State Div. of History & Records.

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Price \$425.00 — Including 2 Regulators, 2 hoses and 2 harnesses. Four other models available. For brochures send self-addressed stamped envelope to:

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Ph. 305/942-3205

L.A. COUNTY'S 28 UICC

Los Angeles County's 28th Underwater Instructor Certification Course will be held from January 5 through March 29, 1980. The pre-test for the prestigious three-month long training program will be held November 3rd and 4th with an ocean evaluation on November 9th. Prospective candidates must be willing to commit every Saturday and every third Sunday to the course. Tuition is \$200.

For information, contact: Aquatics Unit, Dept. of Parks and Recreation, County of Los Angeles, 155 W. Washington Blvd., Los Angeles, CA 90015. Or call (213) 744-4341.

HYDRO PHOTO EXPANDS

After ten years of company growth in Seattle, Hydro Photo is expanding to larger facilities on the shores of Admiralty Inlet in Puget Sound. The new location near Port Ludlow is in the hub of the Northwest's diving, fishing and recreation area. The new address is: Rt. 1 Box 548, Port Ludlow, Washington 98365. Phone (206) 437-2405.

TIRE REEFS BLACKLISTED

The California Department of Fish and Game has announced that old tires, used as building materials for artificial reefs, are on the DFG blacklist. John Carlisle, coordinator of the DFG's artificial habitat program said, "Tire reefs have been something of a disaster in coastal waters."

The main problem is that tire reefs placed in open ocean areas eventually break loose from their concrete anchors and either wash ashore, creating a cleanup problem, or drift to other areas, causing environmental damage. Even the tires that remain in place have little value in providing a haven for fish because they are soon covered over by drifting sand.

"Because of several tire reef fiascos along the California coast, it is highly unlikely that the state will allow any future artificial fishing reefs to be built using surplus tires," Carlisle concluded.

REGULATOR REPAIR CENTER

Ray Lambert Enterprises, in southern West Virginia, services all late model U.S. Divers regulators. The repair center carries a complete line of parts for Calypso, Conshelf, and Aquarius regulators, and K and J valves. Divers wishing to have their regulators or valves overhauled should ship their equipment, postage paid, by United Parcel Service to: Ray Lambert Enterprises, Rt. 1, Box 646, Sullivan, WV 25930. When repairs are complete, the equipment will be returned C.O.D. by UPS. For information, call (304) 683-4595.

U.S. DIVERS RECALL

U.S. Divers has received a report of a malfunction of a Calypso regulator in the field. It is possible for the high pressure seat located in the first stage of the regulator to move from its position, thus restricting or shutting off the airflow to the diver.

U.S. Divers has thus made the decision to voluntarily recall all Calypso 1083 and 1084 regulators manufactured since 1971. Owners of these regulators should take them to their Aqua-Lung dealer or send them to U.S. Divers. Repairs are free. These regulators should not be used until they have been retrofit.

DACOR RECALLS PACERS

Dacor Corp. has announced a voluntary recall of all Pacer regulators shipped from the factory prior to August 1, 1979. A flaw, which occurred during fabrication, has been discovered in the top cover of the second stage and can cause free flow.

All Pacer owners who suspect they have a faulty unit should take it to their nearest Dacor dealer for free repair. If there is no dive shop nearby, the unit should be sent to the Dacor factory where it will be repaired free of charge.

Because of a design modification, Pacer regulators shipped after August 1 are not involved in the recall.

YMCA SEARCH AND RECOVERY PROGRAM

The National YMCA Scuba Program will conduct a Search and Recovery Training Program February 11-15, 1980, in Key West, Florida.

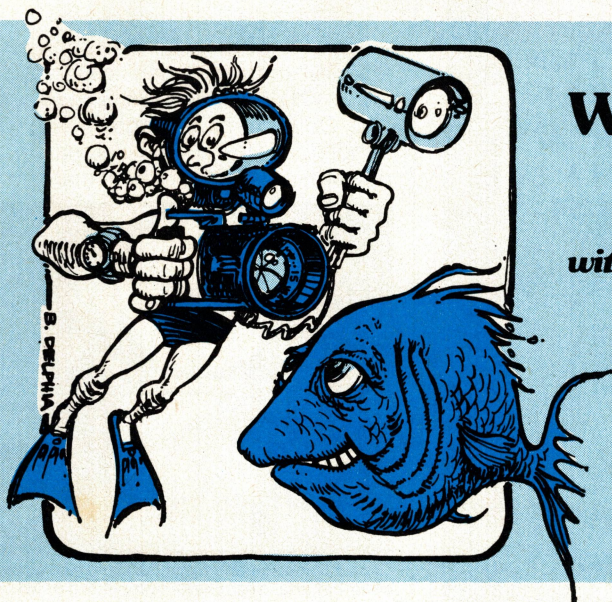
The program is designed to give fire, police and rescue personnel, who are certified scuba divers, advanced training in search and recovery procedures. Subjects to be covered will include: Organization of a Search and Recovery Team, Search and Recovery Dive Planning, Search and Recovery Diving Hazards, Search Patterns, Rigging and Light Salvage, Lifesaving and Emergency Procedures, Linehandling, Search and Recovery Equipment, Special Problems, and Use of Boats.

For information contact: Search and Recovery Program, National YMCA Underwater Activities Center, P.O. Box 1547, Key West, FL 33040.

FLORIDA'S PDIC

Florida's Professional Diving Instructor College has announced a new east coast instructor training center located in Jacksonville. The Florida PDIC is a fully accredited scuba instructor training college offering a variety of training programs for certified divers interested in careers as a professional diving instructors. Florida PDIC offers three training programs: a ten week resident course, a two week course and a special weekend training program for students.

Got a BAD Underwater Photo?



Use it to
**WIN a FREE Underwater
Photo Course**
with **JIM and CATHY CHURCH**
**Spanish Bay
Reef Resort**
GRAND CAYMAN, B.W.I.

If you think you've taken the world's worst underwater photo, don't throw it away. Enter it in the Jim and Cathy Church "World's Worst U/W Photo" contest. And if Jim and Cathy agree, you will win a free, one-week diving vacation and multi-level U/W photo course with Jim and Cathy Church At Spanish Bay Reef Resort.

YOU CAN WIN:

8 days, 7 nights (Winter, 1980 season) at Spanish Bay Reef Resort. Including three meals a day, 12 boat dives, all taxes and gratuities.

Tuition to the photo course (and use of a Nikonos and strobe if needed). Includes text books, film processing, camera accessories, slide shows and demonstrations, help above and underwater.

Plane fare from Miami or Houston to Grand Cayman, compliments of Cayman Airways.

Taxi to and from Grand Cayman airport to Spanish Bay Reef Resort.

(Winner is responsible for travel to Miami or Houston, and all personal purchases.)

COURSE DATES:

Winter, 1980: Feb. 13-20, Feb. 22-29 and March 3-10.

Yes, your worst U/W photo could get you this terrific prize! The only requirement is that the picture must have been taken by you — somehow — underwater. Your photo must prove — without a doubt — that you do indeed — need a course with Jim and Cathy. So, if you have been throwing your ugly pictures away, quick — go take some more!

During the course, Jim and Cathy will do everything they can to help you take beautiful pictures. They will present slide-talk shows on how to compose your U/W photos, help you under-

water, process your film and critique it with you the next morning. You can use a wide variety of U/W photo equipment, and will have your individual questions answered. You will be entertained with fantastic slide shows, and will learn how to take the pictures you need for your own fantastic slide shows.

Spanish Bay Reef Resort is the Caribbean's finest diving facility. The underwater life is exciting, abundant and accessible to your camera, and a spacious classroom is provided for the photo courses. The cuisine is superb, the rooms are comfortable (with maid service), and the staff is cheerful and efficient. Spanish Bay Reef Resort is the ideal locale for a diving vacation and U/W photography course.

TO ENTER:

1. Submit your one worst 35mm slide or print (5 x 7" or smaller) to Jim and Cathy Church (World's Worst U/W Photo Contest, P.O. Box 80, Gilroy, CA 95020).
2. The picture must show a discernable U/W subject — not just a black frame.
3. Jim and Cathy will choose the worst U/W photo. And if they can't agree, the final selection will be made by a random drawing from the worst of the worst.
4. The contest is open to certified divers 18 years of age or older. Relatives of Jim and Cathy are not eligible.
5. Entry deadline is Dec. 15, 1979. The winner will be notified by phone by Dec. 30, or by cable if residing outside of the U.S.
6. If you want your entry to be returned, enclose a self-addressed, stamped envelope. Otherwise, entries will be destroyed.
7. Void where prohibited.
8. Enter with coupon or facsimile.

SEND YOUR WORST U/W PICTURE TODAY — YOU CAN'T WIN IF YOU DON'T ENTER!

Dear Jim and Cathy (P.O. Box 80, Gilroy, CA 95020)

As you can see, I really need your help. Enclosed is my worst photo to show how worthy I am.

Name _____

Street _____

City _____ State _____ Zip _____

☐ Send me a course brochure right away. I may want to take the course even if my picture is too pretty to win.

Note: You are eligible to enter even if you are already enrolled in one of the Winter, 1980, courses.

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Rugged, Reliable, Digital- Like no other dive watch

The DIVEMASTER™ is tested to 750 feet, has a bright L.E.D. display and features a unique lifetime battery system. You never change batteries! The batteries are recharged by solar cells built into the face of the watch*. The DIVEMASTER™ is programmed for adjustment-free operation to the year 2100 and accurate to within 8 secs. per year. The entire system is permanently sealed in a virtually unbreakable Lexan® module. Available in brushed stainless steel at \$129.95 or black ceramic finish at \$159.95.

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*Batteries will function for appx. one yr. of use without exposure to light.



YELLOW SUBMARINE

A prototype of a one-man submersible recently underwent certification tests at the David W. Taylor Naval Ship Research and Development Center, Annapolis Laboratory. The K-600 submarine was put through a series of both manned and



Official U.S. Navy photograph

Capt. Kittredge rides open-hatched sub out of test chamber after successful completion of 600' dive.

unmanned tests in the Lab's Deep Ocean Pressure Tank. This high pressure test chamber can simulate the pressures of the ocean environment to a depth of more than five miles.

During the unmanned test, the 14 foot yellow submarine was initially tested at 900 feet. The submersible was later manned by its designer/builder Captain George W. Kittredge (USN-RET) and tested in a simulated ocean environment at a depth of 600 feet. This marked only the fourth time that a manned simulated dive has taken place at the lab. The tests were witnessed by officials from Lloyds Register of Shipping and Det Norske Veritas, and results were forwarded to those firms for final evaluation.

NAUI SCHOLARSHIP

The North Atlantic Branch of NAUI will award a \$1,000 Commercial Diver Scholarship for the third consecutive year at NAUI's Underwater Symposium and Film Review in Boston, Mass., April 1980. The scholarship is sponsored by Undersea Systems of Bay Shore, NY.

In establishing this scholarship, Robert Shourot, President of Undersea Systems, commented that "as underwater contractors, we have been increasingly aware of the shortage of trained and skilled divers, especially in light of the growing offshore industry... increased oil exploration, power generation, and the like. Our industry needs more professional divers."

The Commercial Diver Scholarship will be awarded to a diver who wishes to enroll in the Coastal Diving Academy, Bay Shore, NY. Candidates must be prepared to prove financial need. For further information and application blanks, contact: NAUI Scholarship, % Robert R. Ericksen, 40 Cornell Street, Staten Island, NY 10302.

IMPORTANT NOTICE Regulator Recall

U. S. Divers has recalled all of its Calypso® 1083 and 1084 model regulators due to a potential problem with the high pressure seat located in the first stage of the regulator.

It is possible for the seat to move from its position thus restricting or shutting off the air flow to the diver. If this occurs, use of the regulator would be unsafe.

These regulators should be brought to an authorized Aqua-Lung® dealer for free repair before being used.



U.S. DIVERS CO.

3323 West Warner Avenue, Santa Ana, California 92702
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THE MOST UNIQUE AND ADVANCED
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SEND US A TRACING OR A XEROX
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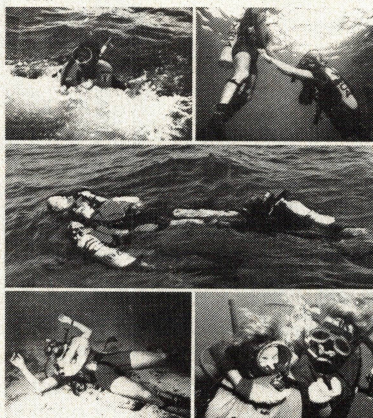
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YMCA SLAM PROGRAM

Most basic scuba courses today spend a cursory few hours on rescue techniques. These may involve simulated recovery of a submerged victim in a swimming pool and/or towing a tired diver during open water exercises. Advanced courses will spend more time and go into greater detail: Students may perform actual mouth-to-mouth resuscitation in open water and haul divers up the beach and into position for CPR.

Until just this year, there has been no

Scuba Lifesaving and Accident Management



over 40 photo illustrations of actual S.L.A.M. Techniques.

specialty course available which focused solely on lifesaving and accident management as it relates to sport scuba diving today. But now the YMCA, with support from NOAA and CNCA (Council for National Cooperation in Aquatics) has produced a long-needed course and a detailed textbook.

Scuba Lifesaving and Accident Management, the manual for the SLAM program, explains in step-by-step fashion how to detect the signs of an "accident about to happen" and suggests how to prevent accidents. It then gives the latest techniques for performing an actual rescue involving divers and sophisticated dive gear. Chapters deal with assessment of the situation, actual contact and handling the victim, and conclude with evacuation and support procedures.

The actual course work for the SLAM program may vary from region to region and instructor to instructor. However, the course is generally completed in one weekend: A three hour lecture and written exam on Friday night, seven to eight hours of waterwork on Saturday (pool or open water), and about six hours of open waterwork on Sunday. The final day's work includes a "total action scenario" in which participants simulate the management of a dive accident from beginning to end, including interface with local advanced life support units.

For further information on the YMCA's SLAM program or to purchase the SLAM manual, contact: National YMCA Center for U/W Activities, P.O. Box 1547, Key West, FL 33040.

Danny's Holiday Specials!

EXTENDED TO NOV. \$10.00 OFF Danny's Special Suit

A Super Puma 100% Amazon rubber \$18.95

B U.S. Div. Rocket Fins \$16.95

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SPECIAL: \$16.95

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E Mico Mask for small faces 100% Amazon rubber \$14.95

F Cobra Sub Fins 100% Amazon rubber for comfort \$18.95

G Nylon 2 sides, high waist pants, jacket and hood \$136.00 (BLACK ONLY)

H Farmer with 2 velcro shoulders \$164.00
SIZE: X SM./SM./M./L./XL.
SEND HEIGHT & WEIGHT
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Tel. (516) 223-8989
Located bet. Sunrise Hwy. & So. State Pkwy.

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- ☐ E Mico Mask \$14.95
- ☐ F Cobra Sub Fins \$18.95
- ☐ G Regular wet suit WAS \$136—NOW \$126.00
- ☐ H Farmer style wet suit WAS \$164—NOW \$154.00

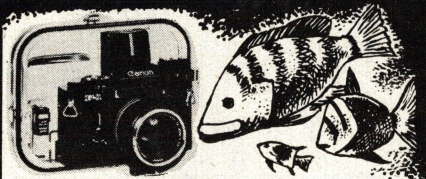
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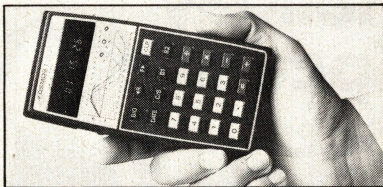
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Any diver can predict how sharp his response will be with the **KOSMOS 1 BIORHYTHM COMPUTER/CALCULATOR**, which can help you chart your physical, emotional, or intellectual cycle for the days you plan to go exploring.

After determining your biorhythm, Kosmos 1 also can serve as a handy four-function calculator.

So don't go diving without the most important equipment of all: insight, courtesy of **KOSMOS 1**.

KOSMOS is offering the BIORHYTHM COMPUTER/CALCULATOR, three manuals, and an adapter — a \$55.95 value — for only \$39.95 postage paid! (Georgia residents add 4% sales tax. Foreign orders add \$3.50 for overseas shipment). To rush your order or request a free catalogue of other **KOSMOS BIORHYTHM COMPUTERS**, call 1/404/523-2626.

KOSMOS 1

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Please send my:
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Allow 2 to 4 weeks for delivery. If not delighted, return items in original box in 10 days for a complete refund.

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WRECK FILM SHOWS U-352

Beneath the Killing Sea, a new film by underwater cinematographer Bill Lovin, takes viewers into the world of giant East Coast shipwrecks including the German submarine U-352.

The 27 minute, 16mm color documentary explores an area known as the Graveyard of the Atlantic off the coast of



North Carolina, where more than 2000 ships have been lost. The film concentrates on four wrecks, all sunk during the first months of American involvement in World War II when Allied shipping and German U-boats clashed within sight of the North Carolina coast.

Using old newsreel footage and original still photographs, the film recounts the unusual circumstances of each ship's loss. Underwater footage follows divers as they explore these wrecks, now home for rich marine communities.

The climax of the film is a visit to the German submarine U-352. Lying in 120 ft. of water, the U-boat is completely intact. It is the grave of eleven crewmen and an armory for torpedoes, depth charges and 88mm rounds. The U-352 is the subject of a national controversy, as debate rages over whether the wreck should be destroyed because of the live ordnance on board.

Beneath the Killing Sea is available for showing through schools, clubs and dive shops. Rental is \$75, purchase is \$390. The film is distributed by Marine Graphics, Box 2242, Chapel Hill, NC 27514.

THE CAYMAN ISLANDS PROJECT

At the request of the Government of the Cayman Islands, the Institute of Nautical Archaeology will conduct a comprehensive archaeological survey of historical shipwrecks along the coastlines of this island group. The resulting inventory and assessment of these sites will provide a window into the Caymans' unique past.

Photographic equipment for the project, including two Sekonic L164B light meters, was donated by the Copal Corporation, Woodside, NY.

TRAVEL WHOLESALER

New World Diving in association with Conference Travel Services, Inc. and under the direction of Philip Mettra has announced the opening of its headquarters in New York. New World Diving is the first diving package wholesaler in New York.

New World Diving's schedule for 1979/80 includes dive tours worldwide for every level of diver — whether expert or novice — to the Cayman Islands, Red Sea, Truk Lagoon and Africa. All tours are accompanied by an expert diver, familiar not only with the U/W terrain but the surrounding area as well.

For further information write: New World Diving, 551 Fifth Avenue, Suite 1425, NY, NY 10017.

WEDDING BAND FOUND

A gold wedding band, with initials and wedding date inscribed inside, was found at Eden Rock in Grand Cayman on August 7, 1979. If you are the owner of this ring or have information that might lead to the owner, contact Susan Gin, 8406 Birchcroft St., Dallas, TX 75243. Phone (214) 348-8040.

NAUI BROCHURES PROMOTE DIVING

What's new in diving? New divers, says NAUI in a new full-color brochure entitled "Learn to Scuba Dive." The brochure is part of a major NAUI effort to lure



Jeanne B. Sleeper and Walt Amidon

non-divers into the sport. The brochure describes the physical and emotional pleasures of diving as well as its vocational and recreational aspects.

A second brochure, entitled "Diving is Forever," covers Introductory, Sport Scuba, Advanced and Specialty Diver categories as well as the many careers in dive instruction.

The brochures are available free of charge by writing NAUI Headquarters, P.O. Box 630, Colton, CA 92324.

BERRY SCUBA

Berry Scuba of Chicago has appointed Len Romano as its new manager. Len is a certified PADI instructor and he also conducts CPR and first-aid classes.

Berry Scuba is located at 6059 W. Addison, Chicago, IL 60634.

ATTENTION DIVING CLUBS

SKIN DIVER has a special diving club rate available for group orders. (Magazine will still be delivered to each member's home.)

skindiver

6725 Sunset Blvd. Los Angeles, CA 90028
Attn: C. Murray

☐ Please send details on **SKIN DIVER's** club subscription rate.

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Undersea Safari Equipment, by John C. Noyes, Fish Collector, announces REEFNET™ KITS (special barrier nets) at \$27.95 (incl. UPS within continental U.S.) for AQUARISTS/DIVERS to catch their own valuable reef fishes.

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U/W life support systems are potentially dangerous to a non-trained user. These include scuba tanks, regulators and buoyancy compensators. This ad does not constitute an offer to sell these items via mail order.

MCKENNEY FILM AT DEMA

Jack McKenney will premiere a new film produced by U.S. Divers Company and Bob Abrams at the DEMA show on Sunday, January 20th, at the Marriot in New Orleans. The 45 minute film, entitled, *The Underwater World of Florida*, is



a fast moving and entertaining look at the wide variety of diving that Florida has to offer. The combination travel, adventure and educational film depicts the underwater beauty of Pennekamp Park, the excitement of diving the deep wrecks off West Palm Beach, spring diving, river floating, Fort Jefferson and the Dry Tortugas, manatees and giant turtles.

This will also be the third year that Jack has presented his Dive to Adventure film series. The two hour programs are produced by professional dive stores, clubs and councils for the purpose of bringing divers together in a social evening and to promote the sport of diving. With this new Florida film, Jack is now offering three entirely different programs.

For further information on films, program cost, scheduling dates and promotion, contact: Jack McKenney Film Enterprises, 1842 Micheltorena Street, Los Angeles, California 90026.

INFLATABLE INVITATIONAL

The first major race of inflatable boats in the United States, involving a variety of manufacturers' top boats and drivers, will be held off Key Biscayne, Florida, on November 3, 1979. The First Annual Inflatable Invitational, sponsored by Semperit/SDPA and Metro Dade Park and Recreation Department, is officially sanctioned by the United States Inflatable Boat Association.

Competing boats will range from 5 hp dinghies to high-speed powerboats of 75hp and over, and will present a showcase of styles, sizes, brands, and capabilities of inflatable boats. The boats will race on a rugged triangular course of from three to fifty miles, depending on the size of the boat and motor. The race will begin and end off Crandon Park Beach on Key Biscayne.

Semperit manufactures a full line of inflatable boats which are marketed in the United States by Steyr Daimler Puch of America, Greenwich, Connecticut.

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JOB OPENING IN ST. CROIX

The West Indies Laboratory of Fairleigh Dickinson University will have an opening for a Diving Supervisor starting in November, 1979. Candidates must have at least a Bachelor's Degree in Biology, have a nationally recognized certification as an instructor and at least four years of experience in teaching advanced scuba diving. The position will require teaching an Advanced Diving for Scientific Purposes course twice per year, and overall supervision of the diving program at the West Indies Laboratory on St. Croix. The Diving Supervisor is also the liaison person with the NOAA sponsored Hydrolab saturation diving project. He or she will be closely associated with the decompression facility that is run by the University. Candidates must have a mechanical ability to repair compressors, and a good knowledge of maintaining and keeping small boats in order. The West Indies Laboratory maintains a diving locker with the capability of supporting 50 people in the field per day, and is probably one of the most highly advanced diving facilities in the Caribbean.

This will be a permanent position and as a staff member of the University there are excellent fringe benefits. The position will allow travel to the mainland to attend meetings and update capabilities. Top candidates will be brought to St. Croix for interviews. Interested parties should contact Dr. Robert Dill, Director, West Indies Laboratory, P.O. Box 4010, Christiansted, St. Croix, U.S. Virgin Islands 00820.

NY DIVE SHOP

The Westchester Dive Center, located at 62 Westchester Avenue in Port Chester, New York, has recently doubled its store facility to over 1500 square feet. Included in the new expansion is a diver's



lounge, a used equipment counter, a complete repair station, a 24 hour E-6 slide processing lab, and a women's rental area.

Representing 26 manufacturers and soon to install a second air system, the Westchester Dive Center is the county's only pro dive shop devoted solely to the diving community. The center instructs in five different levels of diving as well as four specialties. Information can be obtained by calling (914) 937-2685 (10:00 am to 6:00 pm).

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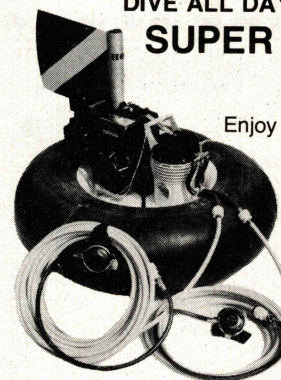
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AN AMPHIBIOUS SOLUTION

TO RED SEA EXPLORATION

BY BILL GLEASON

Mention the Red Sea to a gathering of divers and the group will divide into two factions, the lucky ones who have been there and those who are planning to go. La Mer Tours has recently introduced two new ways to explore the Red Sea that will satisfy adventurous novice and veteran divers alike.

Combine the splendor of the Sinai desert, unlimited diving in the Red Sea, comfortable accommodations, and throw in camels as the only way to get to one of the dive sites and you will see that these tours are designed specifically for divers. The diver responsible for La Mer Tours is Amos Nachoum, a native Israeli who wants to show visiting divers not only the legends of Ras Muhammed and



Diving with La Mer Tours is done both from the spacious, 96 foot *Sun Boat*, and from speedy Zodiacs (above). The diving is great either way.

Sharm el-Sheikh but the virgin areas of an oasis by the sea, called Neviot, and exotic places with names like Hibeck and Ras Abu Galum. All of La Mer's tours last two weeks; the option left open to the diver is to travel by land or by sea.

The cruise safari uses the services of the *Sun Boat*, a spacious, fully equipped 96 foot vessel — the only live aboard dive boat in the Red Sea. The minimum number of divers aboard is eight, and the maximum 12. A crew of six, in-



To reach the dive site at Hibeck, the local mode of transportation (above) is used. Bedouin tribesmen will help you and your dive gear onto camels and lead you to one of the finest Sinai dive sites.

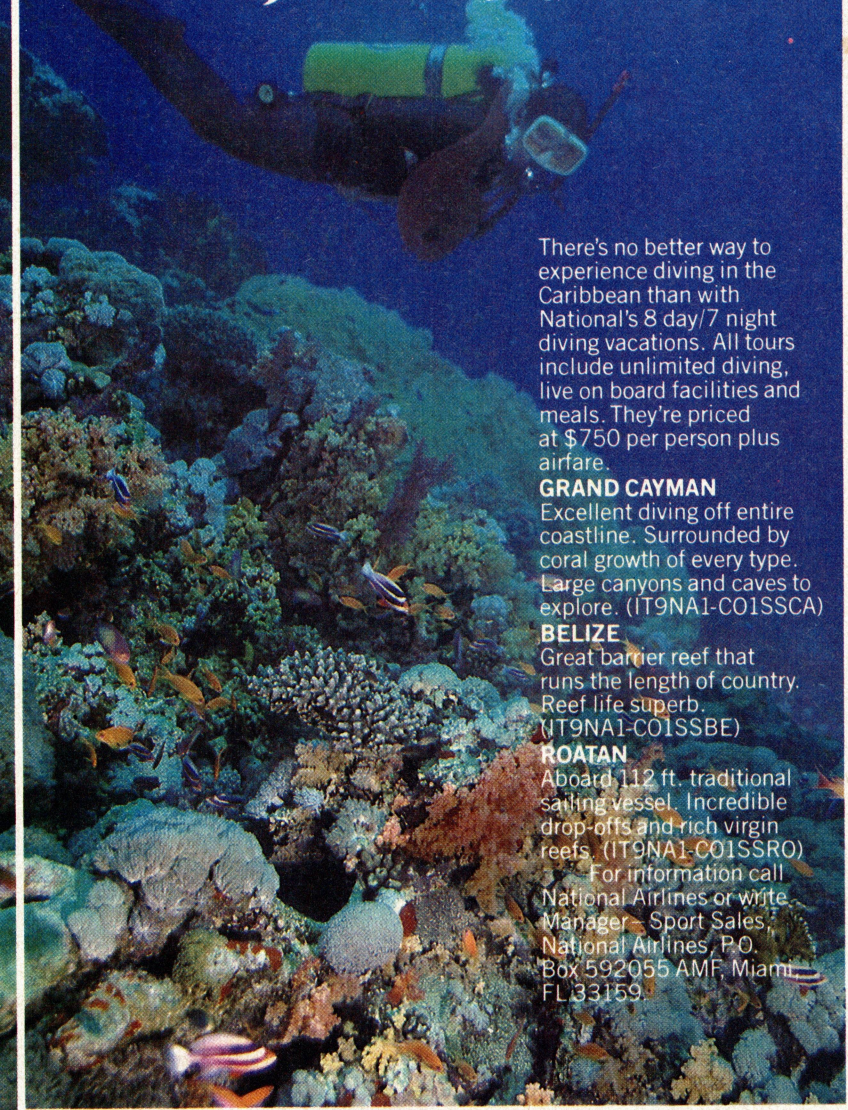
cluding three dive guides, ensures that unlimited diving is not just a promise, but a reality. Anytime four or more divers want to dive, there's a dive. Night, day, dawn, or dusk. The *Sun Boat* offers double berth cabins and three meals a day. Diving is done both from the *Sun Boat* and from Zodiacs. These low draft inflatables eliminate surface swims and make it easy to get to out-of-the-way dive sites. The comfort, range, and varied itinerary of the *Sun Boat* makes exploring the Red Sea a new experience.

Amos' tours take advantage of the full 150 miles of Sinai coastline, following a general diving rule of thumb: the more inaccessible the dive site, the more memorable the dive.

The land safari, beginning at the coastal city of Eilat, travels the full length of the coastline in air conditioned mini-buses. By using the mini-buses and four wheel drive vehicles, both the sea and the desert are explored. The land safari even has a few nights spent under the stars in the Sinai desert, a great way to experience a land that hasn't changed since biblical times. These desert campsites are alternated with traditional hotel accommodations.

At Hibeck, for example, the land safari has a unique

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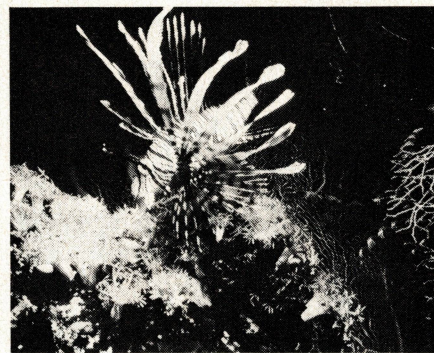
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AMPHIBIOUS SOLUTION

first for visiting divers. Since this dive site cannot be reached even by four wheel drive vehicles, the local mode of transportation has to be called in. Bedouin tribesmen will help you load your dive gear onto camels, help you onto the camel, and lead the camels to one of the first dive sites on the Sinai. The drop-off is within ten feet of shore; and caves, tunnels, and prolific coral growth dot the underwater terrain. Rays and turtles are also seen at Hibeck, and the amount of fish life on this virgin reef is spectacular. If conversation is for some reason lagging, there's still the camel ride back to talk about.



Both the cruise and land safaris have some dive sites in common. One of the most rewarding of these is called the Canyon, located at an oasis named Dahab. Here is a chance for divers to dive in a reef as well as on it. The caves of the Canyon, entered soon after starting your dive, are spectacular. The majority of dive time is spent in the cave, with various exits and windows providing glimpses of the outer reef.

Any dive in the Red Sea is exciting, and La Mer Tours has put together the best dives of each area in the Red Sea and offered them in a single package. Tiran Island, Ras Muhammed, Sharm el-Sheikh, and Sucoon. Translated for divers: sleeping sharks, whales, endless varieties of multi-colored hard and soft corals, and a dazzling array of fish life. By land or by sea.

In keeping with the tour policy to experience as much of the sea, desert, and people of the Sinai as is possible, the last two days are spent in Jerusalem. The desert, the Red Sea, and the history of this timeless land are etched on the faces of the people of Jerusalem. And, after exploring the market and the historic sites of Jerusalem, the diver feels that it's been more than a diving vacation: For two weeks you've actually been a part of the Sinai, an area steeped in custom, tradition, and some of the best diving in the world.

For more information about La Mer Tours, contact: La Mer Diving Safaris, 453 F.D.R. Drive, NY, NY 10002.

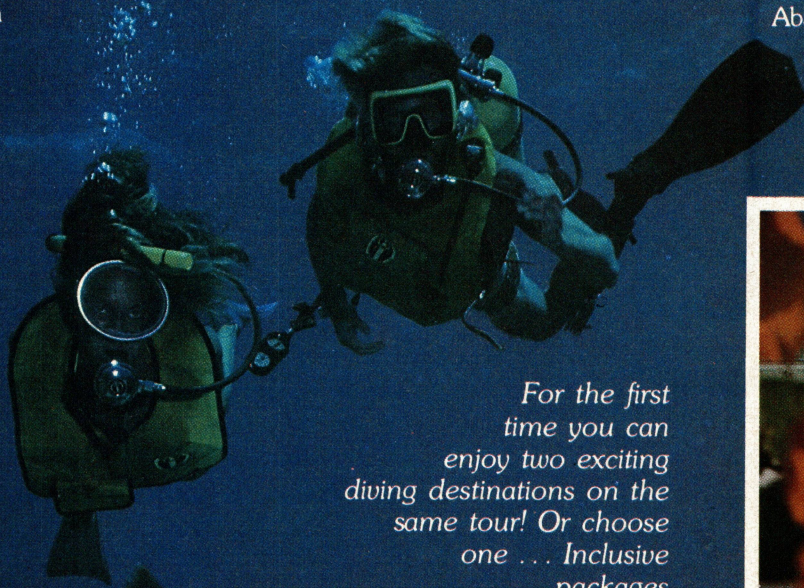
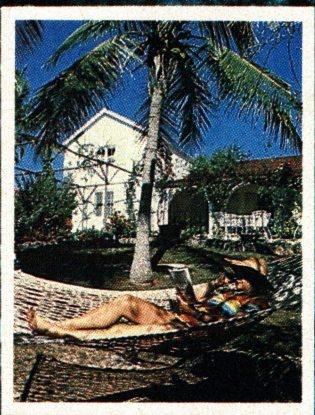
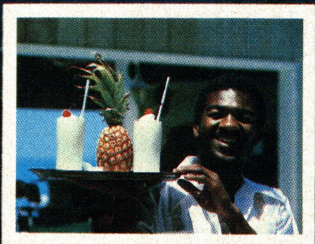
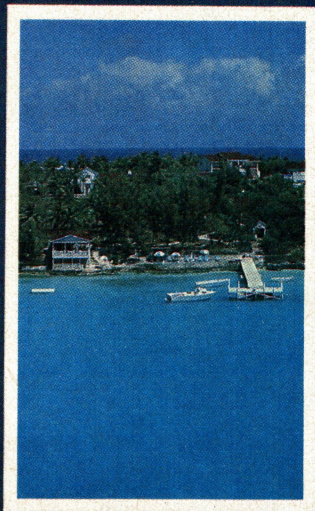
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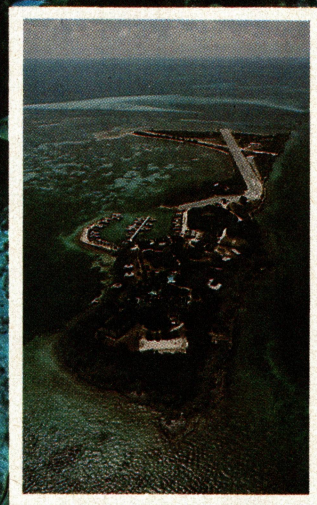
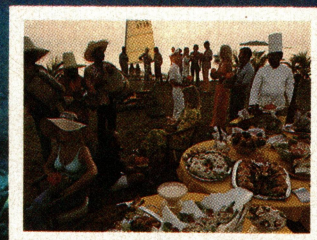
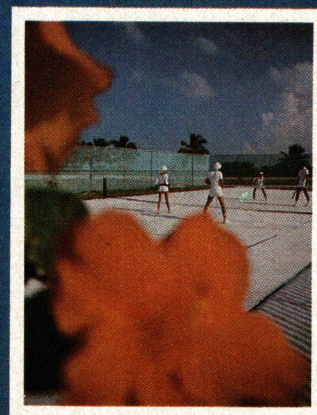
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Divers Directory



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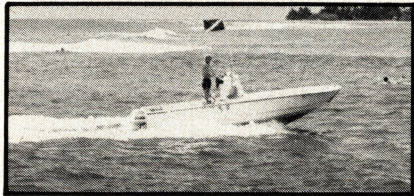
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POSEIDON VENTURES TO MARSHALL ISLANDS

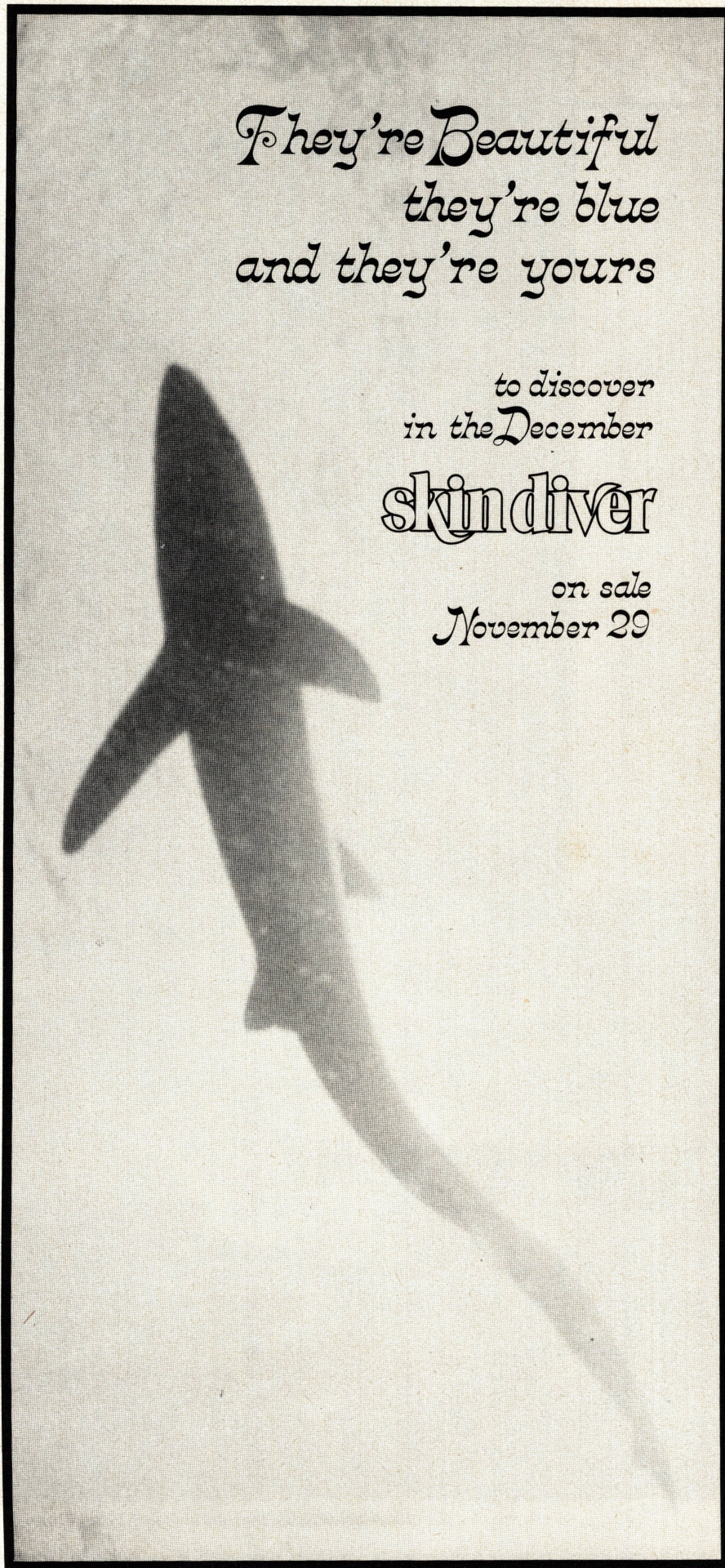
Art Travers of Poseidon Ventures has announced the inception of a new cruising/diving program through the Marshall Islands in Micronesia. A 44 foot luxury sailing/diving yacht will visit the islands of Arno, Wojie, and Malleap, which have been hardly touched by civilization since World War II. Awaiting the visitors are islands and atolls as beautiful as those in Tahiti; coral reefs and drop-offs equal to those in Palau, and remnants of Japanese military equipment both below and above the surface.

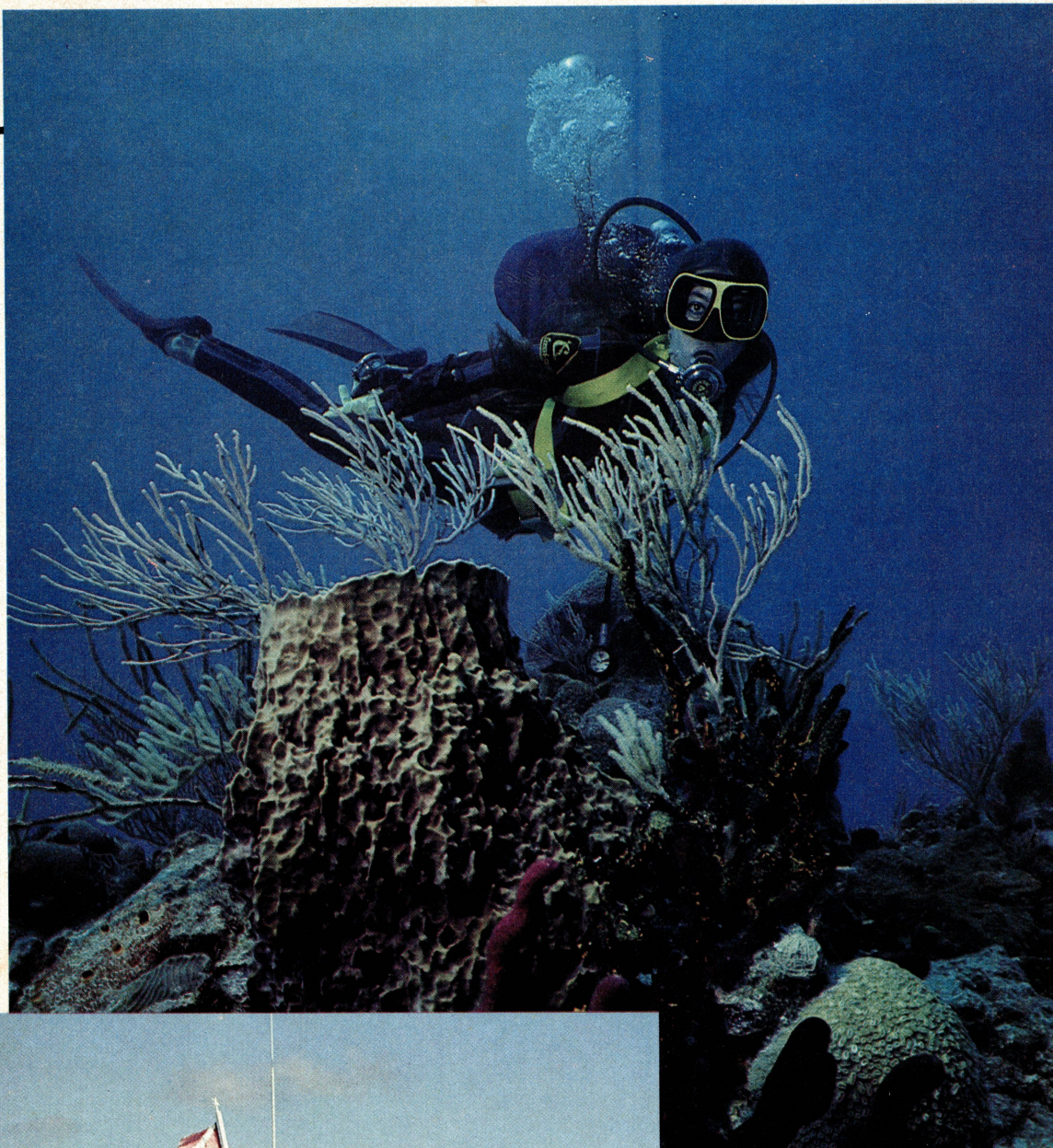
One week programs from \$625 are being offered. These include all meals, unlimited diving, guides, etc. Special introductory prices are also available. Contact Poseidon Ventures, 359 San Miguel Drive, Newport Beach, California 92660. 🐠

*They're Beautiful
they're blue
and they're yours*

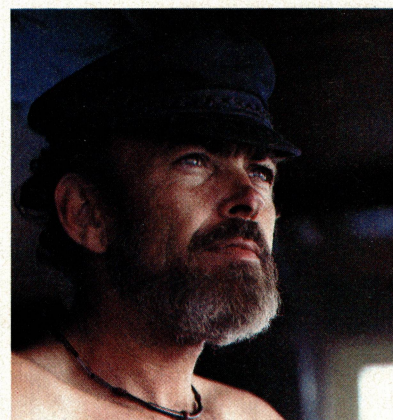
*to discover
in the December
skin diver*

*on sale
November 29*





Captain Ed Deckerd (below) is president of Adventure Cruises and a veteran dive boat skipper. The *Highlander IV* (left) cruises to Bimini, the Exumas, Grand Bahama Island, and southern Out Islands. Specialty programs offered include U/W photography and marine biology cruises.



Photography By Tom Mount and Paul Tzimoulis

**An
adventurous
cruise
aboard**

THE HIGHLANDER IV

By Tom Mount

Do you want to do something different, add spice to your diving vacation, and cruise a varied assortment of tropical islands? If so, join Adventure Cruises' "The Reef People," and their boat *Highlander IV*. Adventure Cruises has been sailing the Bahamas since 1960. *Highlander IV*, the boat used during production of *The Bahama Divers Guide*, has been called "the dive boat with soul."

Captain Ed Deckerd is president of Adventure Cruises, bringing over 25 years of diving expertise to the business. He was one of the first YMCA instructors, is a PADI instructor, and has taught over 2000 divers. In addition, he has 15 years of experience working throughout the Bahamas on dive charter boats and on research vessels. With a complete appreciation of the diver's needs, he has chosen his crew with great patience and professionalism, guaranteeing everyone the best possible vacation.

Accommodations aboard the 65 foot *Highlander IV* are comfortable and the food is fantastic. In addition to cruises to Bimini, Grand Bahama Island areas, the Exumas, and the southernmost Out Islands, special interest charters are also available. Specialty programs offered include learn-to-dive cruises and, for the more experienced, Blue Hole diving cruises, underwater photography and marine biology cruises. Crew members are all certified dive instructors and are available to assist visiting instructors teaching their own programs aboard the vessel.

Captain Ed is enthusiastic about *Highlander IV*'s contributions to diver enjoyment. He is warm, sensitive, and receptive to ideas and is interested in doing all he can to make your vacation or training program the best possible.

The *Highlander IV* normally carries ten divers, though it can accommodate twelve. The advantages of these small groups are numerous; some obvious ones are more privacy, more personal interactions, and more diving. Two people are assigned to each stateroom and there are three heads, complete with showers, on board. A sun deck over the main salon is enjoyed by most divers during surface intervals.

A typical *Highlander IV* vacation begins with an early morning flight to the selected point of origin via Atlantic Coastal Charters. After customs is cleared, divers are taken to the *Highlander IV* where they and their equipment are assigned spaces. The *Highlander IV* is well equipped, and the diver need only bring a couple of changes of clothes, toothbrush, buoyancy control device, mask, fins, snorkel, and regulator and, if you desire, a wetsuit.

Once you are settled into the stateroom and have secured all your dive equipment, the next stop is the galley. Here you are greeted with a superb luncheon — delicious but light — and while you relax, the ship slips out to sea.

The splash of the anchor entering the water sounds, to a diver's ear, like the gong of the starting bell at a race. While dive equipment is donned and the dive plan discussed, your heart pounds in anticipation of that first splash into the beautiful blue Bahamian waters.

By jumping over the side or by stepping down the dive ladder, divers enter the water while cameras are handed overboard. Skimming along on reefs 40 to 60 feet deep, you are greeted by curious groupers, eyed suspiciously by passing snappers, and delighted by the variety of corals.

Perhaps the greatest thrill of this first dive isn't the beauty of the reef and its inhabitants, but rather the sheer joy of once again feeling the freedom of the sea.

After an exhilarating morning, excited voices retell the adventures of the dive, while the boat moves to a new and even more spectacular location. After the second dive, which is at a shallower reef, you enjoy the warmth of the afternoon Bahamian sun.

One thirst-quenching beer along with a lively rehashing of the day's activities and it is time for dinner. And what a feast! It's amazing that such gourmet meals can be served on board a vessel at sea. After dinner, a slide show is presented in the main salon, introducing the guests to some of the upcoming week's dive sites.

In the morning, you are greeted with the fresh, salty smell of the sea, then the aroma of fresh perked coffee. In the galley, a fantastic breakfast has been prepared complete with juice and coffee. During this time, the boat continues to another new dive site and the first dive of the day. After a couple dives, a light lunch is served and plans are made for the afternoon's events.

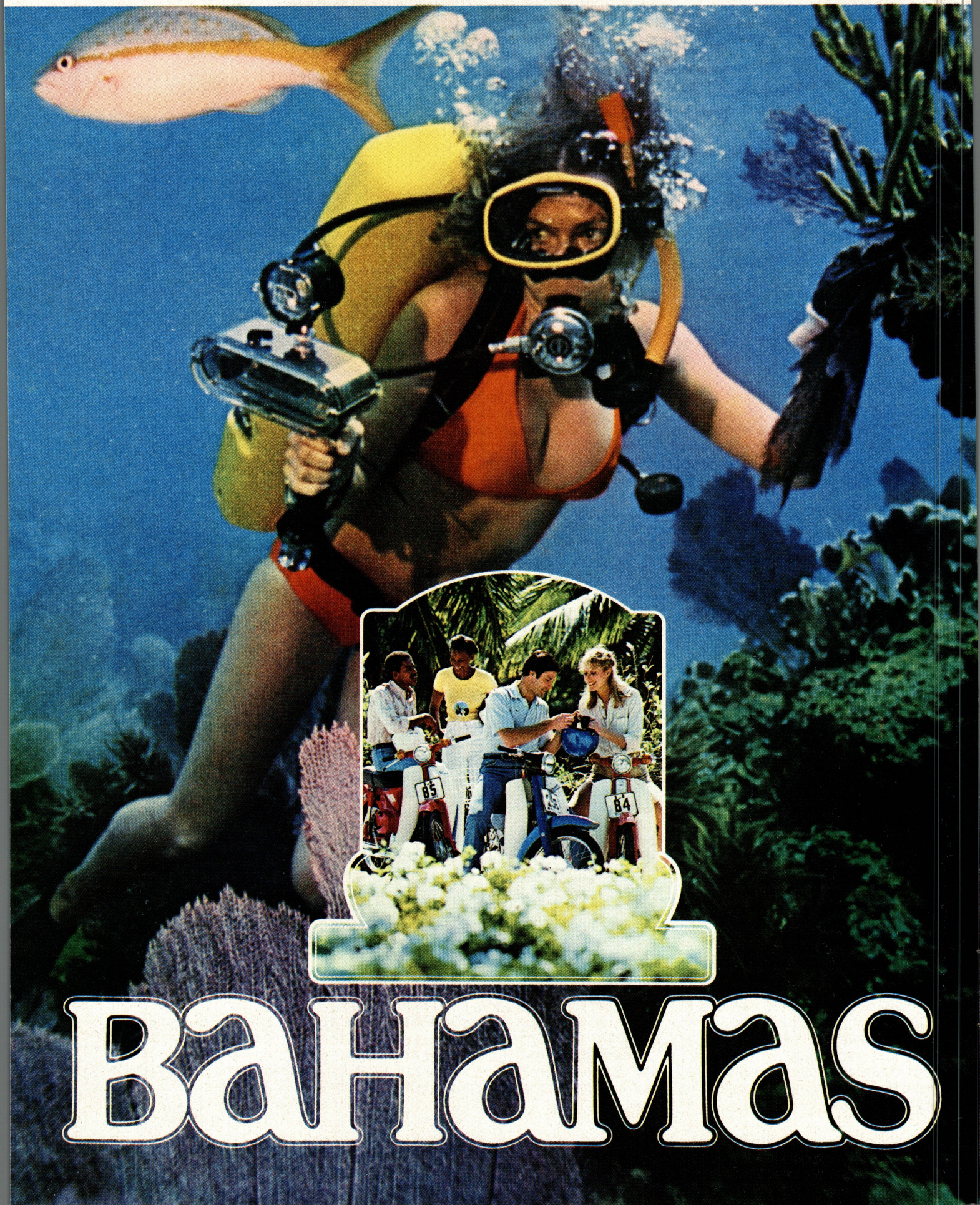
On this day, an early dinner is served, and preparations are made for the first night dive which, as all the dives on the following nights, proves to be fabulous.

After the night dive, a wine and cheese party is held under a bright, tropical moon. A romantic end to a perfect day.

Each day of the week proves to be equally as exciting and varied as the first two days: wall diving, night diving, current and drift diving — all can be had while cruising on the *Highlander IV*.

For more information, contact: Adventure Cruises, P.O. Box 22284, Ft. Lauderdale, Florida 33335.

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Then come ashore and discover our fabulous golf, tennis, sport fishing and endless stretches of pure white sand beach that the two of you can have all to yourselves. After a dazzling sunset, wind down in the intimate ambience of our Out Island clubs. Or wind up in the glamorous discos and casinos of Nassau and Freeport.

In The Bahamas, you'll find hundreds of islands, each with its own personality, yet all with one thing in common. Scuba. You'll have dozens of resorts to choose from, some catering exclusively to divers. All with superb facilities, safety gear, top guides, and plenty of back-up equipment.

Your Travel Agent or dive shop can design a Bahamas diving package that's just right for you. For more information, call toll free 800-327-0787. In Florida, 800-432-5594. In Dade County, 443-3821.

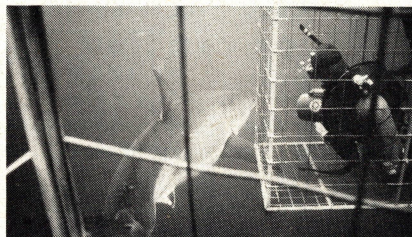
The Bahamas

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Long Island
Nassau/Paradise Island
San Salvador
and hundreds more.

GREAT WHITE SHARK EXPEDITION

See & Sea Travel of San Francisco has announced its third Great White Shark expedition to South Australia in February of 1980, escorted by renowned underwater photographer Carl Roessler.

Prior expeditions have filmed a total



of 11 great white sharks, ranging in length from 11 to 15 feet. Some of these sharks weighed well over a ton and were filmed from as little as a few inches away.

The program offers small groups of divers an opportunity to film great whites from surface cages tethered to 40 foot boats. The cages have viewing areas for some of the most exciting photography in all the undersea world.

For further information on one of the world's most exotic undersea programs, contact See & Sea Travel.

U/W MEDICINE IN BONAIRE

The Flamingo Beach Hotel on Bonaire will host Diving Medicine in Depth (DMD) January 12-20, 1980. The program, conducted by Human Underwater Biology, will be presented at the post-graduate medical education level for physicians; it is the most highly accredited program of its type currently being offered to the medical diving community.

Specifically the program is designed to acquaint physicians with: the physics, physiology, characteristics and dangers of the underwater environment; the pathophysiology, recognition and immediate care of diving casualties; proper emergency transportation of stricken divers to appropriate recompression chambers and the performing of medical examinations for sport divers.

An unlimited diving program, arranged by Peter Hughes of The Angel of the Islands/Dive Bonaire will supplement the academic program. A dive course also will be available for physicians and their families who wish to become certified divers.

For information contact: Program Coordinator, Department 1254, Human Underwater Biology, P.O. Box 5893, San Antonio, TX 78201.

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Dick Portmann

• I cannot express how much I enjoyed myself. The slide show I did for my friends was a tremendous success.

Chris Mills

• Both of you were terrific. I had an absolute ball.

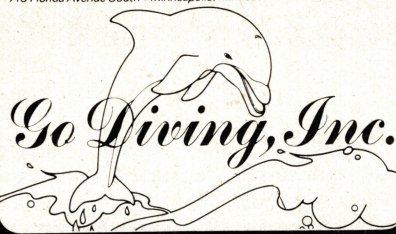
Maurice Levy

• I'll be back.

Stan Botwinik

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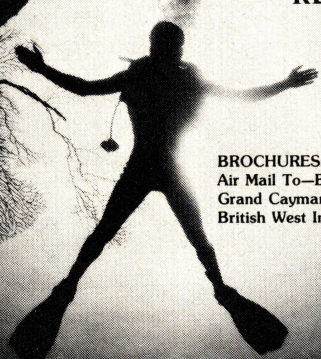
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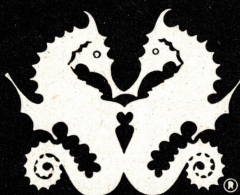
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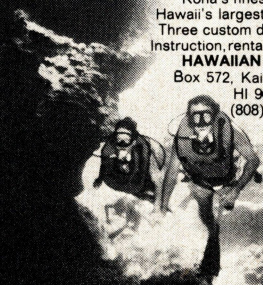
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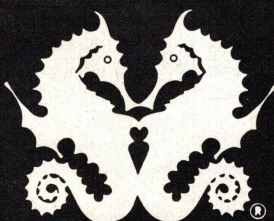
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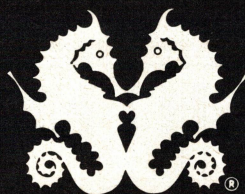
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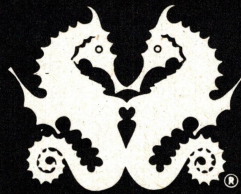
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PENSACOLA'S BIG 3

BY HOMER H. HICKAM, JR.

Pensacola, Florida, is a northwest Gulf Coast city known for its pleasant, beautiful and interesting surroundings. It also has one of the world's great beaches made of miles of pure white, powdery sand. The azure sea that laps this beach is famous for its swimming, skiing, surfing, and excellent sport fishing. It is not especially known, however, for its diving opportunities and that is too bad. Pensacola has a number of choice diving targets off its coast, the best of them are a set of coal barges, a Liberty Ship, and a World War II freighter. Collectively, they are Pensacola's "Big Three" of diving.

Pensacola has an expanding dive boat fleet, primarily owned or chartered by the local dive shops. The 65 foot *Chulamar*, owned by Skipper's Dive Shop, is the best known operation in town and is very popular with the inland dive shops of Florida, Alabama, Georgia, and Mississippi. Since it makes daily trips to one or more of the popular wrecks, I signed aboard for a day of diving to see if the diving was as good as I had heard. Phil Kingry, the *Chulamar*'s skipper, is acknowledged to be the best wreck finder in the area.

After a pleasant voyage through Pensacola Bay, Phil turned the *Chulamar* toward the open sea and began plowing toward our first wreck (or, in this case, wrecks), the three coal barges deliberately sunk ten years ago in an attempt to form an artificial reef. Along the way, a pair of dolphins, symbols of good luck and fortune, joined us briefly and then sped back toward the bay. The sea was very calm and smooth, not always the case for Pensacola's open water. The coal barges are only two miles from shore, however, and can usually be dived on when dives on the deeper wrecks are blown out. Phil dropped anchor and came forward to give us a safety briefing. There have been very few diving accidents on Pensacola wrecks and the dive shops and boat Captains are trying their best to keep it that way. My buddy, Dave Todd, and I were the first divers in. We took a giant step off the *Chulamar*'s bow and plunged into the warm Gulf waters.

The coal barges lie end to end on the very white sand that characterizes the Pensacola ocean floor. Since the barges are relatively shallow, 45 feet deep, this very fine sand can, at times, obscure visibility on these wrecks. This day, however, there was no problem with almost 100 feet of visibility and virtually no cur-

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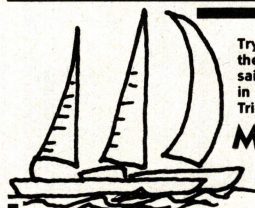
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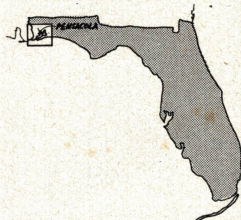
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rent. Dave and I worked our way down the short anchor line and moved out on the wreck. Behind us, a dozen student divers and their instructors followed. The barges are an excellent place for a student diver to begin open water training. They are easy to get to, there is no problem with decompression, and there are a lot of things to see. Among those things, Dave and I quickly found out, were some exceptionally large sand dollars out on the sand away from the wreck. We made our way over to them, and, on the way, discovered a big batfish. We filmed its antics for awhile and then turned back to the barges. The exceptionally clear water allowed us to see almost the entire length of the first barge plus 20 divers spread from its bow to its stern. A few amberjack swooped in and out, scattering a school of silversides. We stopped and just watched. It was one of those beautiful moments that makes diving sometimes a very contemplative, relaxing sport.

Phil next took us for a quick look at the wreck known as the Liberty Ship. This hulk was sunk in November, 1976, by the Department of Commerce as part of a comprehensive plan to provide good areas for sport fishermen as well as divers. Since the Liberty Ship has been submerged a relatively short time, it has not, as yet, attracted a large fish or coral population. Phil said it was still an at-

tractive wreck and getting better every week so I wanted to take a look at it. Since the students aboard were saving their bottom time for the next wreck, only a few of us descended at this stop. The Liberty Ship rests 80 feet deep with its canoe-shaped hull rising 24 feet off the bottom. Phil placed the anchor squarely in the middle of the wreck so Dave and I first dropped down inside the deckless hull. The Department of Commerce personnel did an excellent job of stripping the ship, once one of the



tiny freighters mass-produced during World War II, and there is little or nothing left in the way of plunder for wreck divers who like brass or artifacts. There is, we found, a good start being made by star and leaf corals all over the wreck along with a fair fish population of amberjack, scad, and an occasional tropical.

The last stop of the day was the best wreck located off Pensacola, the so-called Russian Freighter wreck. The Russian Freighter (real name: *San Pablo*) has an interesting history. In June, 1942,

the *San Pablo*, a 315 ft. freighter built in Glasgow, Scotland, in 1915, owned by the United Fruit Company, registered in Panama, and recently claimed for use by the War Shipping Administration, sailed from New Orleans to Colombia. On the return trip, she stopped at Port Limon, Costa Rica, with her load of cotton piece goods, gunny sacks, flour, paper, lumber, leather, grease, wire, and four tons of coconuts. She was looking for a safe port since there had been rumors of Nazi U-boat activity in the Caribbean. On the first evening of her anchorage in Costa Rica, however, a U-boat slipped in close and slammed a torpedo into the *San Pablo's* side. The freighter quickly settled into both the mud of Port Limon's harbor and the quagmire of War Shipping Administration bureaucracy which could not figure out what to do with her after that. A salvage company, under the direction of United Fruit, did manage to refloat the *San Pablo* but after that she sat, rusty and deteriorating, for one year while her owners and the WSA bickered. Finally, in July, 1943, the WSA agreed to purchase the *San Pablo* for \$334,900. She was then towed to MacDill Field in Tampa, Florida, for use as a target ship. After the Air Force finished with her, she was completely stripped, towed near Pensacola, and used by the Navy as a target

(Continued on Page 99)

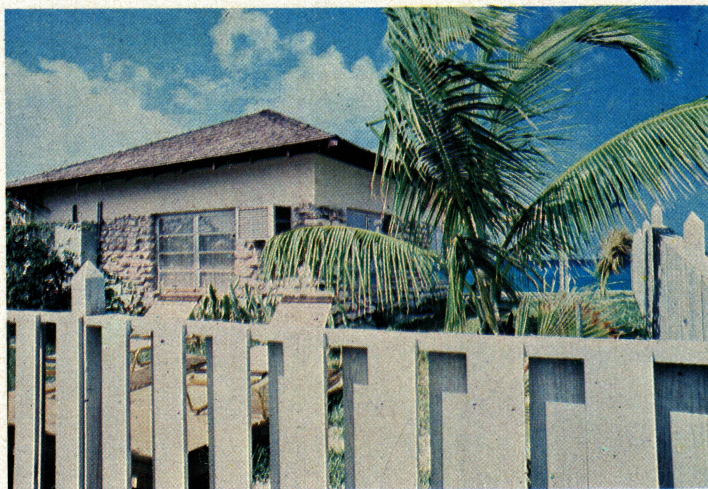
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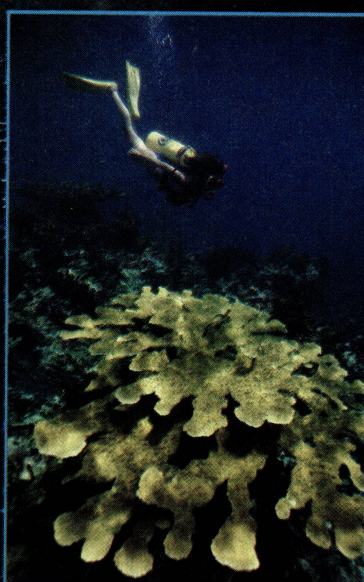
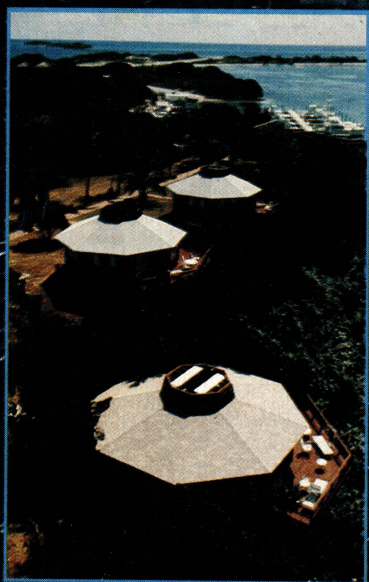
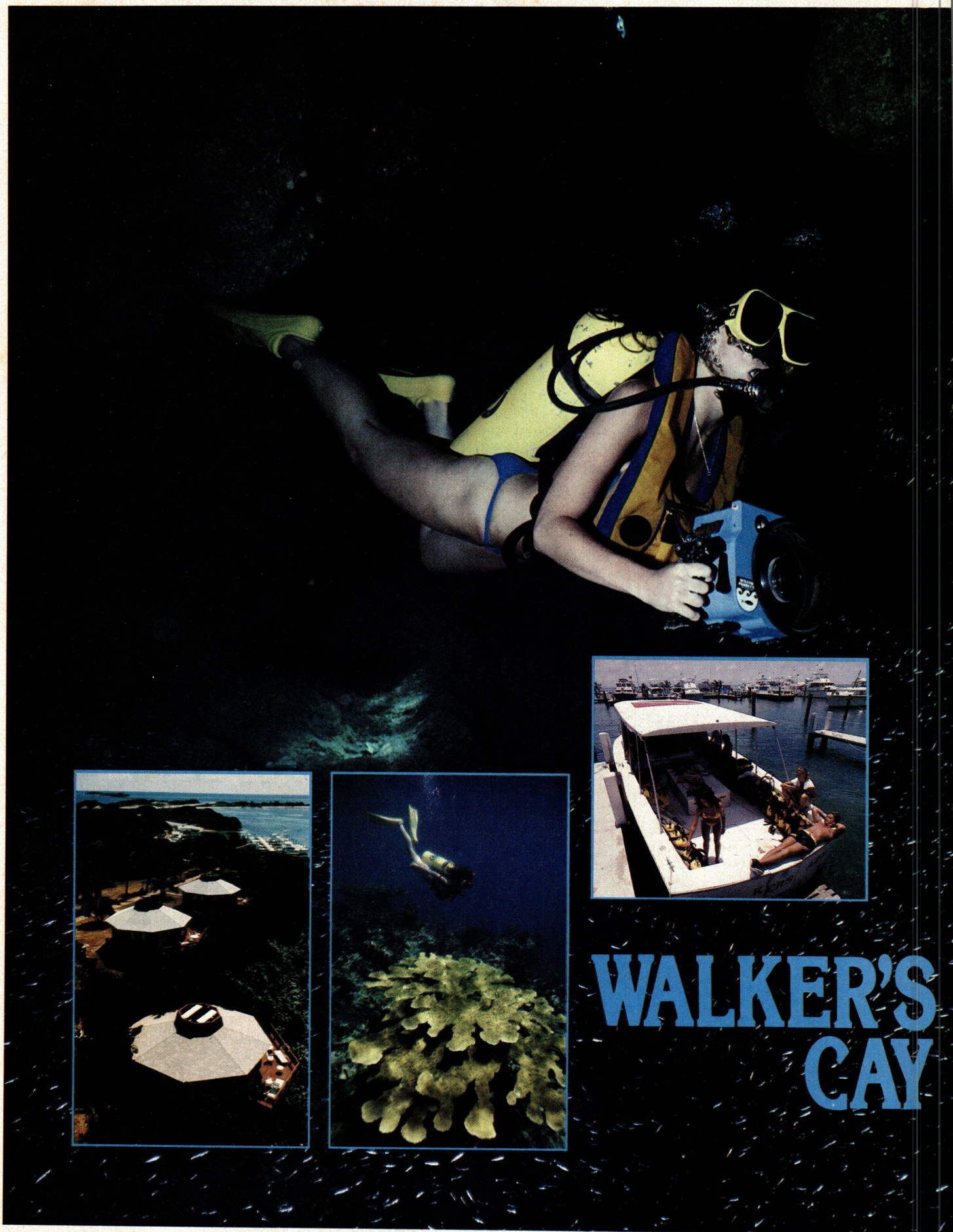
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WALKER'S CAY

High atop Little Bahama Bank, 120 miles due east of Stuart, Florida, and 35 miles due north of Grand Bahama Island is Walker's Cay — a well established and self-contained resort. The original clubhouse at Walker's Cay has been here since 1939 and sport fishing enthusiasts, film stars, politicians and personalities have established the island's reputation as a private Shangri-la for the jet set. Now, with the addition of a 32 foot fiberglass dive boat, a new compressor system and an inventory of new tanks and regulators, Walker's Cay is ready to go diving.

The island's self-contained atmosphere is reassuring. Walker's is a world of its own, complete with customs and immigration service, its own airplane, electrical plant, water distillation plant, hotel, marina, gift shop, disco bar, swimming pool and dive charter services. The island is an hour away from the Walker's Air Terminal, on the north side of the Ft. Lauderdale International Airport, and most flights are arranged on Walker's 16 seat Twin Otter or on Trans Island Airways' twin aircraft.

A low altitude view of the island produces visions of a perfect Shangri-la. Veiled in tropical foliage, Walker's appears as a green gemstone fringed by a necklace of golden corals set into an aquamarine sea. This small cay is only 100 acres in size: enough room for a 34 room hotel, private airstrip, and 75 boat marina, with some left over for a white crescent beach and a hillside of tropical foliage. Just to the north, the breaker's white curl stands out against the cobalt blue of the sea where the water shallows against multi-hued coral reefs.

Each arriving flight is met with a pleasant smile and a personal greeting from the club's young and energetic manager, David O'Shaughnessy. Give five minutes to customs and immigration and you'll be loaded aboard an open van for a two minute trip to the hotel and main clubhouse. After checking in and unpacking a bit, you can enjoy a rum

punch or a cold beer at the open bar which provides a picture postcard view of a sparkling sea and a tropical hillside. Shrieking gulls and other sea birds provide the sound effects and a sinking sun provides the scenery.

Dinner time at Walker's Cay is an experience that will not soon be forgotten. The clubhouse and dining room are furnished with a clean masculine decor. Giant tuna, marlin and shark mounts attest to the many world record catches taken in nearby waters. The menu is one of the best of any dive resort in the Bahamas, featuring freshly caught seafood cooked in every style imaginable. In addition to Bahamian delicacies there are unusual gourmet selections such as Eldred preserve troutlings, tiny breaded rainbow trout served with a special sauce. Avoiding a weight gain while at Walker's Cay, even after a full day's diving, requires early morning jogging around the airstrip or a late night boogie at the Lobster Trap disco.

The diving is also something special. The top of Little Bahama Bank produces a reef system that is somewhat unusual and extremely interesting. While some locals describe a linear barrier reef several miles offshore reaching from the Abacos in the northeast to Matinilla Shoals in the northwest, the system is not a true barrier nor is it continuous. Rather, it is a modified bank reef system with a scattered line of large patch reefs and huge and complex coral heads. The latter are so shallow toward the outer reefs that they are often awash at low tide and constitute an extreme navigational hazard for night cruising. The size and complexity of many of these coral heads is truly amazing. They lie upon a flat white sand bottom, 30 to 50 feet in depth, and appear as immense kernels of popcorn resting in a skillet. They are festooned with swaying seafans, graceful gorgonians, hard corals of all Western Atlantic species and are riddled with caverns, ledges, huge fissures and craggy overhangs. The reef grows upward and outward to the limits of light, food and oxygenation. Meanwhile, a multitude of boring mechanisms, both physical and biological, attack the reef at its area of greatest vulnerability — at its base and outer ledges — creating an extensive system of ledges and canyon effects. In some places the caverns are merely cracks or discontinuities in the reef and in others the caverns are large enough for a diver to swim into the very bowels of the reef.

On the most interesting reefs, which are rarely more than a 20 to 30 minute run from the Walker's marina, you do not swim on or above the coral reef, you swim inside of it. Omorka dive instructor and resident divemaster, Mike Hanna, led us through a coral complex called

Nick's Cavern which is over 100 feet in diameter and over 40 feet tall, producing a 30 minute adventure swim along a continuous fissure through the coral reef. Periodically there were pockets and openings that widened from the slit, filled with an infinite school of small silvery minnows. Overhead through cracks, potholes and crevices, swords of light danced through transparent water. Many such areas that we dived featured enormous heads with extensive cave systems so well developed that horizontal or vertical currents could be detected moving through the reef. There are no true walls or drop-offs here but the sites are immense and awe-inspiring and the shallow depths provide for maximum safe bottom time and dives that can be made on the same day you are flying home.

Outside the reef are a wide variety of reef fishes which flutter above the reef crest while pugnacious Nassau grouper, snappers and grunts guard ledges and undercuts. On one dive, a comparatively rare yellow coney displayed unusual patience as I snapped pictures just inches away. Along the outer edges of Little Bahama Bank, offshore currents provide nutrients which attract a multitude of pelagic fishes. And, with so much blue water nearby, the reefs out from Walker's Cay are a good spot to see amberjack, mackerel and kingfish. This is also one of the best places to see tuna, marlin or sailfish underwater. Schools of dolphin are sighted periodically along with an occasional shark. Visibility will vary, depending on local winds. However, 100 feet is not unusual during late spring, summer and early fall. Winter can produce similar conditions during periods of relative calm.

In early 1976, the owners of Walker's Cay financed an archaeological excavation on a Spanish frigate lost during a storm in November, 1714. The *San Juan Evangelista* yielded 67 cannons, 2 anchors, ballast rock, iron spikes, olive jars and dinnerware. It is full day's trip, but it is now open to visiting divers who can, for the first time, see the remains of an ancient Spanish frigate lying in 35 feet of water. Hundreds of years later the reef is still taking its toll of unsuspecting ships. We also dived on a 25 foot fiberglass sport fisherman which had sunk in 45 feet of water only days before we arrived.

Omorka diving services of Atlanta, Georgia, has packaged several choices for a Walker's Cay dive vacation including a three day, "long weekend," excursion and a combination one week vacation with Romora Bay on historic Harbour Island off Eleuthera. These packages are a bargain in diving and services.

For more information, contact Omorka Ltd., P.O. Box 76721, Atlanta, Georgia 30328. Or call (404) 428-1588.

A private Shangri-la high atop the Little Bahama Bank

**Text and Photography
By Rick Frehsee**

United States Virgin Islands



Photo: Bret Gilliam, V.I. Divers, Ltd.

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North Star Dive Tours, Box 3461,
Christiansted 00820. Tel.: (809) 778-2125

Pressure Ltd., Box 3612,
Christiansted 00820. Tel.: (809) 77-DIVER

Salty Dogs Inc., 59 Kings Wharf,
Christiansted 00820. Tel.: (809) 773-2678

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Christiansted 00820. Tel.: (809) 773-6045

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St. John Watersports, Box 70,
Cruz Bay, Tel.: (809) 776-6256

St. Thomas: (Zip Code 00801)

Aqua Action Inc., Wintberg Peak,
Tel.: (809) 775-3275

Bolongo Bay Beach & Dive Club,
Box 3381, Tel.: (809) 775-1800

Caribbean Divers, Red Hook,
Tel.: (809) 775-1935

Ocean Adventure at Bolongo Bay, Box 7337,
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St. Thomas Diving Club, Box 4976,
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Virgin Islands Diving School, Box 9707,
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PENSACOLA'S BIG 3

(Continued from Page 95)

ship until she was sunk. How the title "Russian Freighter" came to be applied to her is not revealed in the records. Perhaps she was confused with the many Russian-manned freighters that were going into and out of Mobile at the time. Whatever her history, it must be said that the *San Pablo* is an excellent dive.

Again, Phil put the anchor down exactly in the center of the wreck, 75 feet below. Although a stiff breeze had whipped up the ocean a little, the 100 plus feet of visibility remained unaffected. Dave and I were joined by Dr. David Richardson, Chemistry professor at Oakwood College in Huntsville, Alabama. We began our pull down the long anchor line. The sea was a dazzling crystal blue. I looked down and saw nothing but an undulating, silvery plain. Suddenly, the plain opened up, a rip spreading down an invisible seam. Then, incredibly, it closed again. As we got nearer, I realized I was seeing a vast layer of tiny fish riding a thermocline. We passed through the layer and kept going down. As soon as we reached the anchor, we spotted the freighter's twin boilers, lying like overturned silos amidst twisted wreckage. A school of huge amberjack, some of them over six feet long, bulled their way by us as we moved toward the boilers. A flash toward the surface caught my eye. A curtain of fish, probably mullet, descended dramatically in front of the sun and then swept away in unison as if heralding some grand new show. The new show turned out to be a touring circus of sleek barracuda barreling out of the distant haze toward us. They zoomed by, made a tight turn, and put on their brakes. They circled the freighter for the rest of the dive, curious about the bubbling intruders but in no way threatening. In every direction we looked, we saw fish. At times, we were engulfed in darkness by massive clouds of fish flowing above us. When, as they often did, these great schools suddenly dropped to the wreck, it was possible even to lose sight of near-by divers in the explosion of fish.

When our time was up, we reluctantly left the Russian Freighter alone in her deep tomb. After Phil had counted heads, he raised anchor and turned the *Chulammar* toward shore. Near Pensacola Bay, our dolphin pair returned and bounded joyfully on our bow wave. They had brought us the best of good luck. We had seen and enjoyed Pensacola's "Big Three" of diving. »

Education in Diving Medicine

By Marjorie O'Meara

Question: What do a family physician from Arkansas, a perfusionist from New York, a coral reef named Telephone Pole and a Polish divemaster named Zamrock all have in common? Answer: The Physicians Program in Undersea Medicine (PPUM), recently conducted on San Salvador Island in the Bahamas.

PPUM was presented by Human Underwater Biology, Inc. (HUB), the brainchild of hyperbaric physiologist Dr. Bruce Bassett and his publicist wife, Anita. It was the second in a series of underwater medical education programs planned by the Bassetts. Future sites for PPUM, in addition to San Salvador, include Bonaire, Grand Cayman, Roatan, Fiji and the Red Sea.

Why is education in diving medicine necessary? According to Bassett, chief of education, training and special projects of the sophisticated hyperbaric facility at Brooks AFB School of Aerospace Medicine in San Antonio, TX, the average diver, as a result of his basic certification course, knows more than 95 percent of all practicing physicians about diving physiology! With rare exception, the subjects of diving and hyperbaric medicine are not covered in medical school.

Of equal importance, is the scarcity of truly viable sport diving physicals. Most doctors, asserts Bassett, are simply not educated as to the true parameters of diving physiology and its attendant contraindications. As a result, many would-be divers have been told they would never be able to dive; others have been allowed to earn their C-card with dangerous physiological problems.

A growing apprehension over the future of sport diving and its medical aspects led the Bassetts to organize HUB, and to present the first PPUM in April of 1973, also on San Salvador Island.

Their program has a tough schedule, one which has most of the participating docs crying for more free time; but it is incredibly thorough, and is the most highly-accredited program of its type, having the approval of both the conservative AMA and the American Academy of Family Physicians.

Participants attend as many as four classes daily, with up to six hours of indoctrination on the physics, physiology, characteristics and dangers of the underwater environment; the pathophysiology, recognition and im-

mediate care of dive casualties; proper emergency transportation of stricken divers, and the performing of medical examinations for sport divers. The staff of PPUM, in addition to Dr. Bassett, includes Dr. Paul G. Linaweaver, noted diving medical specialist and authority from Santa Barbara, CA, and Dr. Barry S. Kronman, a prominent ear, nose and throat specialist from Melbourne, FL.

In spite of the rigorous schedule, the



Taking physical standards and diving exam lectures to heart and administering thorough examinations are two of last year's participants, Kedar Adour, a neuro-otologist from San Francisco, and John Kihm, orthopedic surgeon from Kalamazoo.

attendants are able to squeeze in as many as three dives per day, mainly due to the careful program-planning on the part of the Bassetts, coupled with the efficiency and facilities of Island Divers, Ltd. and its staff.

At the end of the busy week, the participants are given a written examination (necessary for accreditation) and awarded certificates attesting to their achievement. Most of the states from which these programs draw attendance now have mandatory requirements for continuing medical education. For these physicians, PPUM constitutes a fulfillment of these requirements.

Specific information about future PPUM's can be obtained from HUB, P.O. Box 5893, San Antonio, TX 78201.

Oh yes! The physician from Arkansas was nicknamed "Shot." A perfusionist is a person who operates the life-support system for open-heart surgery. Telephone Pole is a magnificent coral reef with its own private communications support. And yes, there really is a Polish divemaster on San Salvador whose T-shirt is appropriately inscribed, "RETSAMEVID HSILOP!"

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San Salvador Island, Bahamas — a place where veteran divers rediscover why they took up the sport of scuba diving in the first place. For new divers, San Salvador becomes the living reality of their most beautiful visions of underwater adventure. For the seasoned traveler, San Salvador becomes home — the search for the ideal dive resort has ended. Only those who have not yet been to San Salvador ask the obvious question: Why? Perhaps the easiest way to answer this is to simply define what kind of a place San Salvador is, and what one might expect to find during a stay on this little Bahamian Out Island.

Underwater, San Salvador's coral reefs are teeming with fish of every description. Protected from all types of spearfishing, the reefs have become underwater wildlife preserves offering divers an incredible opportunity to observe marine life in an undisturbed natural setting. The resident population of groupers, jacks and snappers fearlessly display a natural curiosity toward divers. It is an every day event for a 12 pound grouper to swim casually to within inches of your face plate and peer inside. This delightful experience may have a devastating effect on the uninitiated but, whether you are a new diver or an old salt, you cannot avoid wondering what the grouper is thinking behind those big unblinking eyes.

The color of the water is a striking aquamarine which is crystal clear most of the year. Visibility averages no less than 100 feet and oftentimes exceeds 150 feet. The superior quality and color of the water make it an ideal location for underwater photographers. The coral reefs surrounding the island are impressive — not only in form but also in the incredible variety that can be found. It is only a 5 to 15 minute boat ride from the marina to some of the finest reefs and drop-offs. Ranging from 200 yards to one-half mile offshore, the drop-off extends the entire length of the island. Starting in about 35 to 40 feet of water, the uppermost part of the drop-off is densely packed with every type of hard and soft coral imaginable. Large sting rays are commonly seen foraging for food in the white sand that fringes the edge of the reef. The wall itself slopes off at a sharp angle extending to unknown depths. The marine life here is particularly lush with a wide variety of colorful sponges, seaweeds and black coral. Many of the reefs are honeycombed with tunnels, caves and deep undercuts providing shelter for the angelfish, snappers and groupers which abound.

Inshore from the drop-offs are many delightful reefs which range in depth from 20 to 30 feet. These shallow sanctuaries are adorned with acres of stag-

horn coral and high coral heads with statuesque elkhorn. They provide a haven for schooling grunts and snappers as well as a colorful array of small tropical reef fish and delicate invertebrates. It is a veritable undersea studio for the aspiring U/W photographer.

The diving activities and services on San Salvador are centered around its one and only resort hotel — the Riding Rock Inn. The hotel consists of 24 rooms and 5 cottages with combined accommodations for approximately 65 people. The main building houses the dining room, a small bar, reception desk, and a veranda overlooking the ocean. The guest rooms are located in two long buildings with half the rooms facing the ocean and other half facing the pool. Beyond the rooms are five stone cottages which are destined to be future time-sharing units that guarantee lifetime accommodations for returning guests. Next is the tennis court and beyond that the marina, dive shop and underwater photo center. It is a compact and complete dive resort with all of the facilities within walking distance of your hotel room.

The dive shop, Island Divers Ltd., sits along the edge of the marina only a few feet from the dive boats. There is a fleet of four tri-hull Flattops, which are almost identical in design. Each dive boat is 34 feet in length, with 12 foot beams providing a tremendous amount of open deck space. Each is equipped with twin outboards, marine radio, a sunroof and wide, heavy-duty dive ladders.

There are presently five qualified dive-masters at the resort and all of them are certified scuba instructors. The dive shop and marina is managed by Chris McLaughlin and Al Zamrok, both of whom have been diving the reefs of San Salvador for the past five years. Together they have charted over 60 dive sites around the island, offering every type of diving imaginable. The other three dive-masters — Dee Scarr, Tom Stansell and Garth Easton — are experienced in reef ecology and will point out the many small creatures you would have otherwise overlooked. They are always eager to assist divers both topside and underwater.

Located a few feet from the dive shop is another building known as the Underwater Photo Center. This facility is operated by Dave Woodward, a well-known underwater photographer with more than 20 years of experience. The facility consists of a large classroom with audio/visual equipment, workbenches, a camera rental department and darkroom lab. Each week Dave Woodward personally conducts introductory one-day photo classes and beginner two-day photo classes here. Students need not even own an underwater camera because a fully equipped rental department is part

of the facility. This is a great advantage to the diver who wants to try underwater photography without having to invest a great deal of money into equipment. Another convenient service offered by the Underwater Photo Center is overnight film processing. This is available for the Kodak Ektachrome films requiring E-6 processing and includes Ektachrome 64, Ektachrome 200 and Ektachrome 400. This invaluable service is a tremendous help to photographers as they check exposures and assure that their equipment is functioning properly.

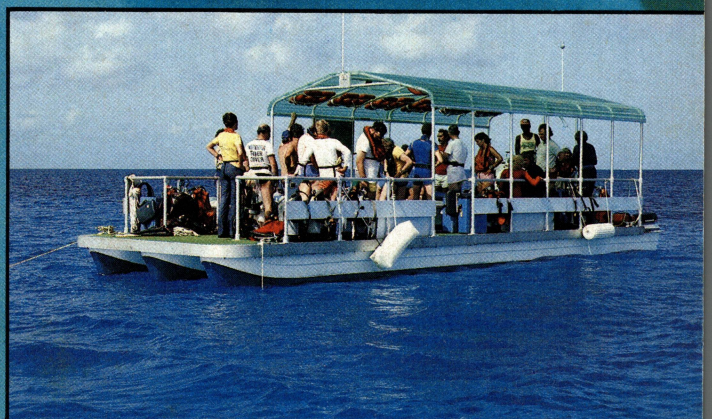
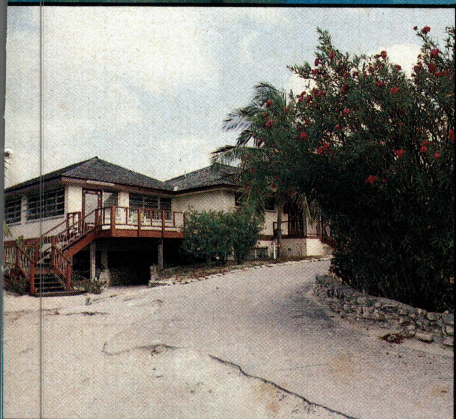
The majority of San Salvador's visitors generally travel to the island by special charter arranged by Columbus Landings Company located in Florida. It is easy to get to San Salvador but, since space is limited, it is wise to make your reservations well in advance. The cost of full dive package is \$528 and includes the following: eight days/seven nights lodging (double occupancy), three meals daily, three tank dives per day for six days and all gratuities. The cost for non-diving companions is \$350. Flights to San Salvador Island depart every Saturday from Fort Lauderdale, Florida. Round trip airfare is \$167.

Hotel reservations and flight arrangements can be made by calling the travel desk at Columbus Landings Company. The toll-free number is: (800) 327-9473. If you live within the state of Florida the phone number is: (305) 566-7441. Should you desire brochures and other dive information, write to: Columbus Landings Company, P.O. Box 1492, Ft. Lauderdale, FL 33302. >

SAN SALVADOR ISLAND

Underwater Wildlife Preserve

Text and Photography
by Geri Murphy



Shari Kurgis and Tom Stansell (above) enjoy the company of a curious grouper at San Salvador. The comfortable Riding Rock Inn (above left), sparkling clear waters, and Island Divers' efficient Flattop dive boats combine to make a vacation at San Salvador a diver's dream come true.



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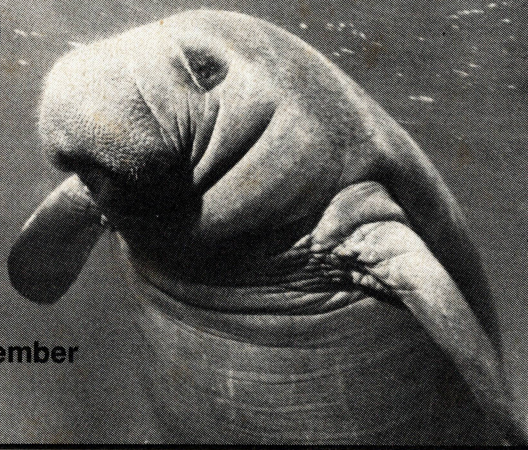
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FLORIDA'S PLAYFUL MANATEE

the mythical mermaid
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Find out how in the December
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RED SEA NIGHT DIVING

Neviot Diving Centre, Israel, has announced the introduction of a specialty course in night diving. The course will be conducted by Martin J. Sutton, a certified instructor (PADI and the Israeli Diving Federation), specializing in night diving.

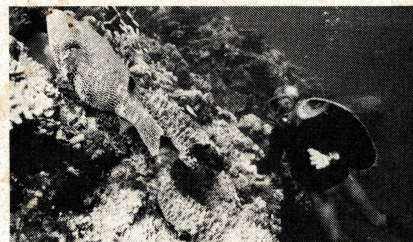
The course will be held over three evenings and can be combined with other diving programs. At the end of the course, successful candidates will receive a PADI specialty rating as Night Diver.

Neviot also offers basic diver certification courses year round. Twice monthly seafaris travel the coast visiting such famous dive sites as Ras Abu Galum and Ras Muhammed.

For further information, contact: Martin J. Sutton, Neviot Diving Centre, Post Eilat, Israel. ✉

SEE & SEA TO MALDIVES

See & Sea Travel of San Francisco has announced trips to the fabulous Maldive Islands and Sri Lanka (formerly Ceylon). Almost halfway around the world, these incredible islands off



the tip of India provide some of the most beautiful diving and photography to be found anywhere. One thousand atolls scattered across trackless open water offer divers countless dive sites of every description: shallow, coral-filled lagoons, swift-flowing passes and dramatic outer reef drop-offs, plunging to the depths of the Indian Ocean.

In addition to the diving, See & Sea's programs offer a five day automobile tour through Ceylon, featuring elephants in the streets, a fortress in the sky, the pink-stuccoed Temple of the Buddha's Tooth, and the thousand year-old city of Polonnaruwa.

For information, contact See & Sea Travel in San Francisco. ✉

GOOD GUYS SCUBA

Good Guys Scuba Service, in St. Thomas, Southwestern Ontario, has recently opened for business. The shop carries a full line of scuba equipment and has a water cooled compressor with a storage capacity of 1100 cubic feet.

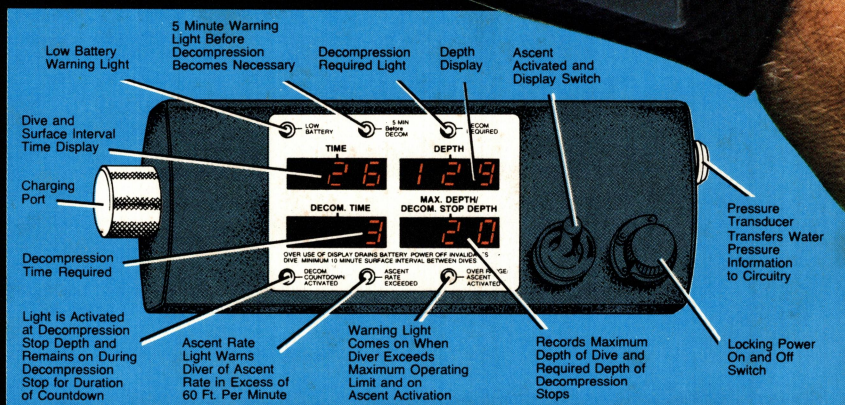
The shop is located at 108½ Ross St., St. Thomas, Ontario, Canada. ✉

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7. Rate of ascent indicator
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9. Low battery warning light
10. Decompression light

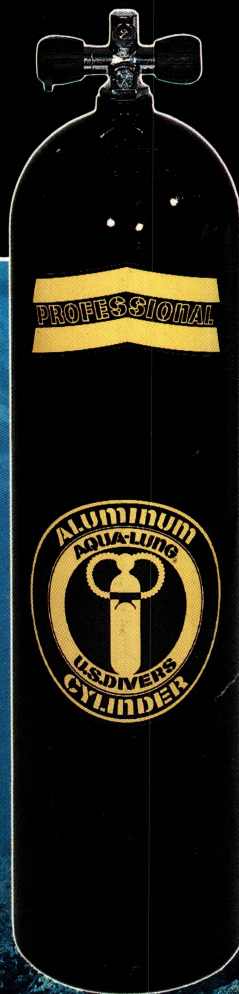
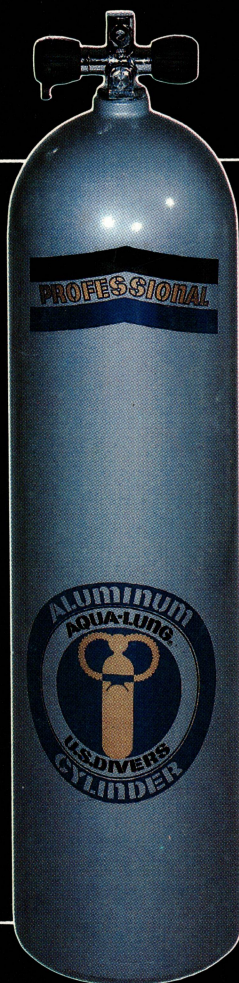
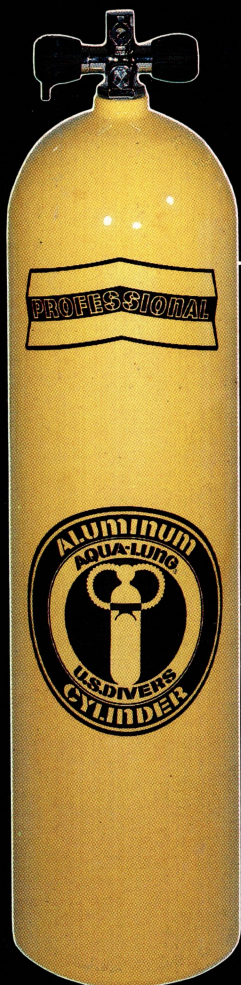
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